The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. XXXVII August 14, 1937 No. 946

The Factories Bill

IN his report for 1936, the Chief Inspector of Factories refers to the first recorded juvenile industrial accident and its sequel, which occurred about the year 1540. It is recorded that: "A yonge childe . . . standinge neere to the whele of a horse myll . . . was by some myshap come wthin the swepe or compass of the cogge whele and therewth was torne in peces and killed. And, upon inquisition taken, it was founde that the whele was the cause of the childes dethe, wherevpon the myll was forthwth defaced and pulled downe." It is natural that after dealing the week before last with the Inspector's Report, our thoughts should turn to the new Factories Bill which has recently been ordered to be printed after its passage through the House of Lords, and which is to come into operation on July 1 next year. We do not now pull down factories wherein there has been a fatal accident, but it is a known fact that factories exist, though we do not believe in the chemical industry, to which that extreme penalty should legitimately be applied.

It has long been a grievance among good employers that they are handicapped in their business by the competition of those who, in the words quoted from the Inspector's Report, regard production as the only consideration, and neglect safety precautions. There was nothing more remarkable during the debate on the Bill than the manner in which all parties agreed that this, the first legislative measure upon the subject for 35 years, is to be regarded as an instalment only, to be tightened up still further as soon as conditions warrant it.

Employers generally will be forced in their own interest to study the text of the measure, and it is only desirable, therefore, to refer here to some of its more important provisions. It was pointed out in these columns when analysing the causes of accidents in the chemical industry that more than one-third of those occurring in 1936 were due to circumstances that were of so general a character as to be widespread throughout every industry. Although, therefore, some of the provisions of this Bill are of especial interest to the chemical engineer, none can be neglected.

The provisions for the cleanliness of the workers and buildings are greatly strengthened and extended. Additional space is required per worker and a minimum temperature of 60° F. is fixed for light sedentary occupations, together with a requirement that the lighting of every part of the factory shall be "sufficient and suitable." The lighting provisions are particularly important for eyestrain and accidents have arisen from this cause. There is a new provision under which there is to be medical supervision of workers in cases of industrial illness; this supervision may be ordered also if, by reason of the changes in any process, or of the substances used in a process, it is thought that there may be risk of injury, or if young persons are to be employed in a process which might injure their health.

A most important provision, to which reference has been made upon an earlier occasion, is that the onus of adequately protected machinery is now shared by the plant manufacturer. All new machinery when sold or hired must comply with the regulations and the seller and user are jointly and severally responsible. There does not appear to have been anything added to the Bill to meet the objection of the B.C.P.M.A. that the provision cannot be applied to imported chemical plant, which can thus be cheaper than properly protected British plant except that the agent who imports such plant is now also responsible; buyers must watch this for themselves, for they will be liable anyway. There are more stringent regulations against the employment of women and boys to clean machinery in motion and, in view of our remarks, it is interesting to observe that young persons are not now allowed to work dangerous machines until they have been sufficiently trained and are adequately supervised. Universal employee training has been brought a step nearer. The precautions against risks have also been tightened up, and so also have the regulations regarding lifts and hoists, in which many accidents occur annually.

The question of hours of work has been very much to the fore, and the Home Secretary in the debate remarked that "Whatever may or may not be in this Bill, the situation is changing and, in future, employers will have to depend less and less on juvenile labour"; this change, of course, was foreshadowed by the Education Act. The statutory hours of work for women and young persons between the ages of 16 and 18 have been reduced from 60 to 48, and for those between 14 and 16 to 44 hours; for the former classes overtime has been reduced from 600 hours a year to 100 hours, and none is allowed under 16 years of age. It was only in 1819 that the employment of children under nine years of age was prohibited, and not until 1874 was the age limit raised to 10, and yet there is truth in the remark made during the debate that "in factory legislation this country has always taken the lead." An addition which should assist in preserving health is that suitable accommodation must now be provided for clothing not worn during working hours, and arrangements are to be made for drying damp clothes. The local Inspector may now prohibit underground rooms in any factory as unsuitable for use if he feels it to be desirable. The Bill aims at improving conditions of work generally, and there will be little criticism of it in the chemical industry, for that industry realises that promotion of the health and well-being of the workers is among the finest aids to industrial efficiency.

Notes and Comments

Decrease in Acreage of Arable Land

A DECREASE of 91,000 acres in the total area of crops and grass is shown in the Ministry of Agriculture's report. This represents the loss to agriculture of land which has gone out of cultivation or has been taken for other purposes and naturally has a direct effect on the fertiliser industry. The most prominent changes since last year have been decreases in the oats area (13.9 per cent.), mixed corn and rye (5.1 and 16.1 per cent. respectively), sugar beet (12.1 per cent.), and the decline in acreage of all root crops (except turnips) recorded last year was continued. The wheat acreage increased by 1.6 per cent., and there was a small increase in barley. The area under bare fallow has increased by 59.3 per cent., and this is probably the most significant figure of them all. A great deal has been heard of the necessity of providing an adequate storage of the basic foodstuffs as a safeguard in the event of war, but it seems that nothing is being done in that direction nor of ensuring that that storage can be rapidly built up in the future by increasing in some way or another the area of land devoted to crops.

Products from Waste Wood

THE profitable utilisation of all kinds of materials, which were formerly regarded as useless wastes, is a subject to which increasing attention is being paid. The potentialities of wood waste as a raw material for the chemical industry do not appear to have been exploited to any great extent in this country. Apart from the production of sulphite pulp, paper and fibreboard from waste wood, distillation yields such products as acetic acid, acetone, methyl alcohol and methyl acetate, which, although produced synthetically, can be prepared economically by distillation in favourable circumstances. Wood lignin obtained from waste has been shown to be a valuable substance for resin formation by condensation with phenols and aldehydes, but a process which might well repay investigation is the saccharification of wood wastes. Both the Scholler and Bergius hydrolysis processes are operated successfully in Germany and, granted that that country's economic affairs are somewhat unique, the production of fermentable sugar by a similar method of hydrolysis might prove to be profitable in other countries also.

The Chemical Side of Production

CHARACTERISTIC of the progress made in many industries is the predominating part played by the chemical, rather than the mechanical, side of the industry concerned. In the textile industry, as pointed out in an article in this week's issue, the trend is towards the production and use of new textile assistants, while the mechanical side of the industry does not contribute much in the way of new machinery, but is devoted mainly to the modification and improvement of existing designs. A more striking example is afforded by the paint and allied industries. The machinery used in the manufacture of paint comprises essentially of heavy paste mixers and pugs, grinding mills, and light mixers for thinning, and this type of machinery has been used ever since paint was first made. The only mechanical developments that have been achieved have been through more accurately constructed and adjusted mills and mixers, although the advent of the single roll mill as against the older multiple roll mill was something in the nature of an innovation. It is very different in what might be termed the chemical side of the process. New oils, thinners, pigments, gums and driers are being constantly introduced, and the paint manufacturer now has at his disposal a wide selection of raw materials, which is almost bewildering in its scope. Progress has been even more rapid in lacquers. In addition to the original nitrocellulose, other cellulose derivatives, especially the acetyl ester and the ethyl and benzyl ethers, have been closely studied and found to have desirable properties as film-forming materials. Suitable plasticisers and solvents have had to be found for these materials, as well as for the numerous synthetic resins, the progress in which is a feature of the chemical world to-day. This is one instance of the many industries which depend almost entirely on the progress made in their chemical raw materials for their own future development.

Railway Rates

EXPLANATION of the 5 per cent. increase in charges which the railway companies will impose as from October 1, is given in the report of the Railway Rates Tribunal which has just been published. Substantial increases in wages, fuel and materials, together with the usual additional expense entailed in the carrying of more traffic, have necessitated the higher charges and it is estimated that the revenue of the companies will not be much greater thereby. As far as figures go, therefore, it appears to be essential for the charges to be raised, but a most important factor is the loss of business sustained through competition with road transport. This is, naturally, extremely difficult to determine, but with the transport of goods growing in proportion to the general expansion of trade it is very much an open question whether the railways decision is a wise one.

Glass Technology

EACH year the Department of Glass Technology of Sheffield University issues a volume of experimental researches and reports which is a collection of the work carried out by the department and published throughout the year in various scientific journals. This is a most useful compilation of material and the plan of such a composite volume might be copied by institutions similar to the department with advantage. This year the volume contains eighteen papers, one of which has not been reprinted, and the following are among the interesting subjects investigated:—The effect of width on the breaking strength of sheet glass, the volatilisation of sulphate from soda-lime-silica glasses, the presence of compounds in molten glass, the determination of iron in glass, the mechanical strength of glass, refractory materials for glass furnaces, chemical analysis as applied to glasses and silicates, and the chemical properties and chemical testing of glass.

Synthetic Washing Agents in the Textile Industry

By
G. S. RANSHAW

AN intimate knowledge of the textile industry to-day, especially as regards its wet finishing side, is necessary for a proper appreciation of the predominant part played by chemical processes, sometimes of a delicate and involved character, in attaining the beauty, utility and variety of modern fabrics, and in realising how thoroughly the treasure houses of science have been ransacked not only to provide new effects and facilitate existing processes, but also to bring about changes which have resulted in whole categories of fabrics being removed from the luxury class, to become articles within reach of the modest purse. The industry is now largely dominated by the chemist. On the mechanical side, principles remain much as they have been for centuries, with those qualitative and quantitative improvements which might normally be expected, but without the successful adoption of any radically new conceptions. On the chemical side, however, the industry has been almost entirely revolutionised during the past twenty-five years. Alongside the evolution of the coal-tar colours and the synthetic fibres there has been, for instance, the important development of innumerable "textile assistants" used to facilitate the various processes in bleaching, dyeing and finishing; the development of synthetic polymerised substances to replace the natural polymers (starch, gums, resins, waxes, etc.) used in large quantities; the adoption of modern chemicals originally evolved for other branches of industry whenever they could be employed with profit; and finally the adoption of new and untried technique when it has been shown that superior results could be obtained in an economical fashion.

Efforts to Improve on Soap

One of the most striking examples of the work of the chemist in modern textile industry is afforded by the history of efforts to improve on the soap used daily in large quantities by the trade, both for scouring purposes and for finishing, since these efforts have laid the foundation for the development of what is virtually a new and important branch of the chemical industry: the manufacture of so-called textile assistants. In practice, of course, these include not only detergents, but also wetting agents, emulsifiers, lubricants, softeners, levelling agents, mercerising assistants and so on, specifically designed for a certain purpose. Many products, too, combine the functions of two or more of these types of agent. It is hoped to deal with assistants other than those specifically designed as detergents in a subsequent article.

Soap cannot be used as a universal agent in the textile trade owing to its constitution as the sodium or potassium salt of a high-molecular fatty acid. This entails a weakness in two directions: a sensitivity to acids and low resistance to the hardness-forming elements of water. The presence of soap in an acid bath causes the alkali salt to be split off, leaving the fatty acid in a free and insoluble state; it is deposited on the goods, develops rancidity, spoils the "handle," and affects the dyeing. The alkali salts of the high-molecular fatty acids, on the other hand, are transformed by the presence in water of lime and magnesium salts, and since the "lime soaps" thus formed are insoluble they are precipitated on the goods and have a deleterious effect on "handle" and appearance, besides making level dyeing impossible.

Turkey Red Oils

The sensitivity of soap, which is a great disadvantage, early led to the use (alone or along with soap) of products which, although built on a fatty acid basis, had greater resistance to acids and lime. The precursor of all these was the Turkey red oil obtained by sulphonating castor oil, *i.e.*, by introducing the SO_3H-radical into a high-molecular fatty acid. A simple formula shows that the product can be regarded as the sulphuric acid ester of a high-molecular fatty acid.

$$CH_3.(CH_2)_7.CH:CH.(CH_2)_7.COOH + H_2SO_4 \longrightarrow CH_3.(CH_2)_7.\underset{\displaystyle O}{\underset{|}{CH}}.CH_2.(CH_2)_7.COOH$$
$$\Big|$$
$$SO_3H$$

The introduction of this group fundamentally alters the properties of the fatty acid, the principal effect being to cause its solubility to rise to such an extent that even the free acids dissolve in water, whereas they are otherwise soluble only after production of a soap, *i.e.*, after transformation to the corresponding sodium or potassium salt. The Turkey red oils thus possess a certain amount of resistance to acids, as compared with soap, owing to the solubility of the free sulpho-ester. They are able, moreover, to some extent, to hold the free fatty acids of ordinary soaps in colloidal suspension, and prevent their deposition. The resistance to lime is also increased since in hard water the salts formed on the SO_3H-group are soluble; should lime soaps be formed on the COOH-group the peptising effect of the sulpho-ester again comes into play, but it is quite insufficient to disperse lime soaps already formed.

Sulphonated Oils

The behaviour of Turkey red oil shows the great importance of the introduction of the SO_3H-group into the fatty acid molecule, and a logical step was to try and introduce as many of these groups as possible. Theoretically it should be possible of the introduction of the SO_3H-group into the fatty acid a molecule of castor oil, but the Turkey red oils only had from 3 to 7 per cent. The first improvement on Turkey red oil was, therefore, the well-known Monopol soap, brought out at the beginning of the present century, with 10 to 12 per cent., whilst in the post-war era, products in which the H_2SO_4 content had been pushed up to 19 per cent. were marketed. To-day there are sulphonated oils in which the degree of sulphonation theoretically possible has been reached.

These practically pure sulphonic acid esters represent the limit to which improvement in this direction was possible, so that when the requisite technique was available (largely as a result of war experience) a change in the type of sulphonation was next tried. By the use of stronger sulphonating agents such as oleum, assisted by dehydrating agents such as glacial acetic acid, the sulphuric acid can be made to attach itself *directly* to a carbon atom, thus eliminating the oxygen bridge and yielding a true sulphonic acid. Sulphonate of palmitic acid would be written:

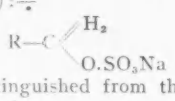
$$CH_3.(CH_2)_3.\underset{\displaystyle SO_3H}{\underset{|}{CH}}.COOH$$

As with the highly sulphonated oils, however, it was found that all these products on account of their sulphatic character as sulphuric acid esters, although resistant in themselves to hardness-forming chemicals, failed to hinder the precipitation of lime soaps already formed, since, in consequence of their extremely hydrophilic nature, they were no longer film-forming, *i.e.*, their colloid nature was overshadowed. On the other hand the average sulphonated oil is still film-forming since much of its "oily" character is maintained, but on account of the relative preponderance of the carboxyl group in contrast to the weak degree of sulphonation, is not entirely stable to hardness and is quite unable to disperse pre-existing lime soaps. Moreover, in spite of the fact that sulphonated oils represented an advance on soap in these directions, they lacked the most important property of soap, namely, washing power. It would seem that the washing effect is conditioned from one point of view by the size of the fatty molecule, only such fatty acids as form the basis of soap being suitable. The

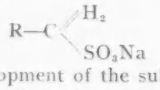
entry of the SO_3H-group into the *centre* of such a molecule, as with Turkey red oil, however, so alters the fatty character of the long-chain acids that the sulphonated oils are no longer to be regarded as washing agents.

So-called Sulphonated Alcohols

This knowledge caused attention to be drawn to the possibilities of leaving the long chain intact, and "blocking" the inconvenient COOH-group. The first method was to block the carboxyl group with lower alcohols and resulted in products which may still be regarded as sulphonated oils where the carboxyl group is esterified with, *e.g.*, butyl alcohol and the alcoholic group with H_2SO_4. The initial products were easily made by sulphonating the oils in the presence of alcohol, but in practice they proved poor lime dispersing agents, but good materials for certain finishing processes unconnected with detergency. They indicated, however, the possibilities of taking a short step from the idea of blocking the carboxyl group through alcoholic esterification to that of replacing the whole COOH-group by an alcohol group. This led to the highly successful "sulphonated alcohols" in which a high-molecular fatty acid is transformed by reduction into the corresponding alcohol. The resulting compounds have, at the end of a long aliphatic chain, not a COOH-group, but a CH_2OH-group, and are subsequently converted by sulphonation into sulphuric acid esters of fatty alcohols (usually marketed as sodium salts):—



They should be distinguished from the pure aliphatic sulphonic acids of formula:



The successful development of the sulphonated alcohols as textile assistants followed on the commercial solution of the problem of reducing fatty acids and esters to the corresponding alcohols. The industrial process is a fundamental modification of the direct hydrogenation process and was originally developed and applied by Schrauth of the Deutsche Hydrierwerke A.G., who applied for patents in 1928. Normann of the Th. Böhme A.G. in Chemnitz developed a similar process at the same time.

These compounds differ from the Turkey red and sulphonated oils in that they have the solubilising or "polar" $O.SO_3Na$-group at the end of an aliphatic chain containing from 10 to 14 carbon atoms, these alcohols having proved to give the best balance of useful properties. Accordingly they possess a closer resemblance to soap, and combine a very good detergent effect without sensitivity to lime or acids. As colloid-electrolytes they are more strongly developed than soaps and consequently possess superior wetting, penetrating and levelling powers. Moreover they retain their fatty character even when highly sulphonated, contrary to the oils which, the higher the degree of sulphonation, the less the amount of lubricating, "brightening" and softening they are able to effect. The sulphonated alcohols have some claim, therefore, to the place of "universal" agent in textile work, and can be used along with soap in moderately hard water by virtue of the protective colloid action on any insoluble lime soaps formed.

Fatty Condensation Products

The possibility of blocking the inconvenient carboxyl group was not exhausted by its conversion to the hydroxyl group, or what is equivalent, the $O.SO_3H$-group of the sulphonated higher fatty alcohols. In another series of bodies which can be conceived of as synthetic soaps the COOH-group of a long-chain fatty acid is made innocuous by blocking with an aliphatic residue to which the solubilising SO_3H-group is then attached. Thus, whilst in the case of the Turkey red and sulphonated oils the particular method of joining the latter group to the fatty molecule, *i.e.*, to its *centre*, appeared to affect the soapy properties of the product, the bodies to be described retain the character of the basic acid owing to the position of the SO_3H-group at the *end* of the molecule as with the sulphonated alcohols.

The fatty acid condensation product type of detergent arises by condensation of fatty acids (or their derivatives) under ester or acid amide blocking of the carboxyl group by short hydrocarbon residues, which then carry at the end the requisite polar or hydrophile groups represented by $O.SO_3Na$ or preferably by SO_3Na. The bi-polar nature of this group of colloidal electrolytes is especially noteworthy. They are definitely carbophile, due to the presence of the fatty acid residue, as well as prominently hydrophile, due to the sulpho group. Between these two groups there is either a short hydrocarbon chain or a methyl-substituted acid amide group. Consequently these products possess an optimum of the useful properties—detergency, wetting power, emulsifying capacity, etc.—required of a textile assistant. The constitution of some of these newest textile agents may now be indicated.

Constitution of Some of the Most Recent Textile Agents

Amongst the best-known is IGEPON A.P. extra and IGEPON T powder. In the first of these oleic acid is condensed with oxyethanesulphonic acid to give

$$C_{17}H_{33}.COOC_2H_4.SO_3Na$$

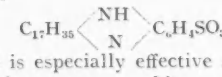
As an ester, IGEPON A is only resistant to lime and acid to a limited degree. Its resistance to hard water is very good, but is exceeded by that of Igepon T. The ester group disturbs the strongly polar structure of the colloid ion only a little, as a classical colloid electrolyte demands. The colloid ions, aggregated to micelles, represent therefore in this product, as with soap, a pronounced washing agent.

In IGEPON T we have the condensation product of oleic acid with methylaminoethane sulphonic acid in the form of its sodium salt:—

$$C_{17}H_{33}.CO.N(CH_3).C_2H_4.SO_3Na$$

As a derivative of an acid amide it is resistant to acids and alkalis at suitable concentrations and temperatures, and has a good dispersing power for lime soaps, preventing their reposition when used along with ordinary soap in hard water.

Another type of the newer detergent is represented by the ULTRAVONS. These are the sulphonic acid salts of heptadecylbenzimidazol, and derive from *o*-phenylene diamine according to the formula:



The monosulphate is especially effective as a lime soap dispersant, the di-sulphonate as a washing agent.

The several brands of MELIORANS are principally components containing the sulphuric acid salt of high molecular fatty aromatic ketones, of the following formula:

$$C_{15}H_{31}.CO.C_6H_4.SO_3Na.$$

In consequence of the anion-active C-sulpho-group present, these bodies have good lime resistance and, owing to their colloid-chemical structure (part hydrophile, part carbophile) are very good washing agents.

Finally should be mentioned the LAMEPONS, as they represent a new departure in so far as solubility or hydrophilic nature is obtained by the accumulation of CONH- and carboxyl groups. They are obtained by the condensation of fatty acid chlorides with protein decomposition products from leather waste, according to the following scheme:

$$C_{17}H_{33}.CONHR_1(CONHR_2)_xCOONa$$

It will be seen that there is here also a definite polar structure coupled with colloidal properties, giving power to disperse lime soaps in spite of the presence of the free carboxyl group, owing to the preponderance of the CONH-groups. Their detergent power, together with high wetting power and emulsifying capacity, ensures these products a wider utility than that of soap so far as textile operations are concerned.

[The author is indebted to Dr. Chwala's articles for the composition of some of the latest products (cf. Osterreich Chem.-Ztg., 1, 1937)].

Automatic Control of Liquid Level in Tanks and Vats

By

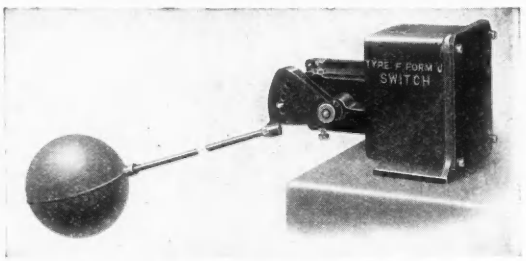
H. SEYMOUR

IN the majority of cases ordinarily occurring in the chemical industry the level of water or other liquid in an open tank or vat can be maintained automatically at a predetermined point by installing switches which control the operation of pumps. By such an arrangement the pump motor can be arranged to start up when the level of the liquid falls below a predetermined low level, or a pump motor can also be put into operation to draw liquid from the container when this liquid has reached a predetermined high level.

The simplest arrangement to achieve such a purpose depends for its action upon a float and float switch. This installation commonly includes, besides the switch, a copper float, iron counter-weight, two iron pulleys, a length of copper chain and four stop buttons for the chain. When the liquid level rises, it carries the float with it and the arm on the switch is tripped by the collars on the chain, thus either switching the motor on or off, as desired. Various elaborations of this system are, of course, possible. Such a system may also be employed in conjunction with electrically-operated valves, in which a motor-driven valve is opened or closed according to the level of the liquid in a tank or reservoir. While the float switch provides a very simple means for starting up or stopping the pump motor, as briefly described, full consideration must be given to the actual type of switchgear employed.

Self-Acting Controllers

All direct-current motors, except the very small sizes, require some sort of starting device, to bring the motor from



A float switch for direct operation made by the British Thomson-Houston Co. Ltd. It is intended for direct starting small power motors, or as a pilot switch for operating contactor starters of large motors.

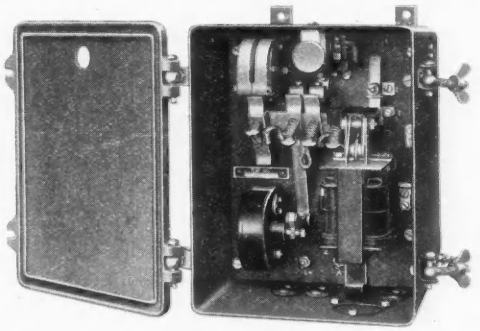
standstill to full running speed without damaging the motor windings or blowing the fuses. Such an apparatus usually starts the motor with a series of resistances in circuit and brings the motor safely to normal running speed by short-circuiting one resistance after another until the full supply voltage is impressed on the motor terminals. This may be accomplished by means of either a hand-operated or self-acting starter. Because of the practical advantages provided, the self-acting type of controller is more frequently used for pump and compressor service. In the case of very small motors which may be started by connecting them directly to the line, a knife switch is used, or if it is not economical to run the power line to the desired point of control, a single-pole or double-pole, magnetically-operated contactor may be employed. Control is effected by pushbuttons, tumbler switches, a float switch or a pressure regulator in the pilot circuit.

Self-acting controllers are popular for this class of service, and they can be divided into two general classes, namely :—

(a) Those in which the acceleration is under time-limit control.

(b) Those in which the acceleration is under current-limit control.

There exists a considerable amount of controversy as to which of the two methods gives the best results for pump and compressor control. The experience of many engineers would tend to show that each has its particular application. With the time-limit method of acceleration the motor is brought up to speed in the same period of time at each start. The period of starting can, of course, be adjusted within given limits. Self-acting starters, designed for current limit acceleration,



A contactor starter of the British Thomson-Houston Co. Ltd., for push-button or pilot switch control. It has definite time acceleration and the moving contact system consists of a multi-finger contactor operated through links by a vertical solenoid.

do not start the motor in a given time, but the current is the limiting factor. If the load started by the motor is heavy, the motor is accelerated slowly, and if the load is light the motor is brought up to speed quickly. In either case the current does not rise above a predetermined and adjustable amount.

Time-limit acceleration is recommended for most cases, as smooth acceleration is ensured for all conditions of load, whereas with current-limit control, if the starting load is likely to vary, the series relays, which will have to be set so as to enable the motor to start up against the maximum loads, will, when the motor is being started up against light load, cause the acceleration to be so rapid as to increase materially the wear and tear of the driving mechanism. Hence a current-limit controller should be used if the starting load remains fairly constant. There are many factors affecting the starting load which at first do not appear obvious; for example, a current-limit starter which operates perfectly satisfactorily throughout the week may refuse to work on a Monday morning, this being due to the fact that the oil has been squeezed out of the journals during the week-end shut-down, causing a considerable increase in the static friction.

The Multiple-Finger Starter

A very satisfactory automatic starter for the control of motors, driving pumps, or compressors is the multiple-finger starter. In this the rate of acceleration can be adjusted to suit the particular machine being driven, and once adjusted will always start the machine in the same length of time. The motor is started by closing the solenoid circuit, which may be accomplished by means of one or more pushbutton stations or tumbler switches, or if used in connection with a pump or compressor-system, the solenoid may be connected into circuit by means of a float switch or pressure regulator. The operation of the pushbuttons, tumbler switches, float switch or pressure regulator will start or stop the motor. This type of starter is suitable for motors up to 10 h.p. on 110 volts and

25 h.p. on 220 and 500 volts. Starters of 20 to 25 h.p. on 220 and 500 volts are provided with a robust contactor switch.

For the control of motor-driven pumps or compressors above 25 h.p., a contactor starter is usually recommended. Such a starter has one main and three accelerating contactors which, together with the master accelerating movements and control fuses, are arranged in a housing provided with a hinged glazed cover suitable for wall-fixing.

Current-limit acceleration is the method of starting and bringing the motor up to speed in such a manner that the time of cutting out the successive steps of resistance is governed by the load on the motor and the resulting current values. Current-limit type automatic starters and controllers for direct-current motors are generally of two kinds: one consists of a series of magnetic lock-out switches, which act as self-governing units, and the other is made up of shunt-wound magnetic switches with series relays. The former type of switch is used for plain starting duty because of its simple construction and operation, and the combination of shunt-wound switches and series relays is used when speed control is desired. The magnetic lock-out switches employed in these starters act as their own current relays and cut out steps of resistance in a certain length of time dependent on starting current values.

Standard types of self-acting lock-out switches are constructed with two coils; one coil, known as the lock-out coil, holds the switch open on heavy current, and the other, a closing coil, closes the switch after the current has dropped below a predetermined value. Both coils are connected in series so that they actually form one coil divided into two sections. This construction obviates the necessity of having a restricted magnetic area. Because of this and the fact that the lock-out coil is short-circuited when the switch closes, the magnetic lock-out switch has an unusually high sealing pull. It will hold in and remain closed on a current approximately 10 per cent. of its continuously rated value. The last accelerating lock-out switch is provided with a shunt coil and will hold it down to zero load.

A suitable type of automatic starter for this service consists of a series of magnetic lock-out switches which close one after another as motor accelerates to speed. Their operation is as follows: The motor is connected to the line through a series of resistances by means of a main contactor controlled by a pushbutton, float switch, or pressure regulator. The heavy current inrush causes the lock-out coil of the first switch to hold that switch open; then, when the current has fallen, due to the motor speeding up, to the value for which the lock-out switch has been set, the pull of the closing coil becomes stronger than that of the lock-out coil, causing the switch to close, short-circuit its lock-out coil and the first step of resistance, and connect the second lock-out coil into circuit. The first lock-out switch having cut out the first step of resistance allows another inrush of current to the motor and the latter continues to accelerate. When the motor current has again fallen to the value at which the switches are set, the second lock-out switch closes. This cycle is repeated until all the switches are closed and the resistance completely cut out of the motor circuit. The last lock-out switch short-circuits all the armature resistance and is kept closed by a shunt holding coil, thereby preventing its opening should the load be decreased or even entirely removed from the motor.

Series relay automatic controllers are used where speed control by series regulation is required. The relays govern the rate of closing of the magnetic contactors according to the actual load on the motor, each relay preventing the cutting out of the next step of resistance until the current has fallen to a predetermined value. They act similarly to magnetic lock-out switches in this respect. As soon as the current has dropped due to the motor gaining speed, the relay allows the switch which it controls to short-circuit the next step of resistance. On account of its inefficiency the series method of regulating the speed of pumps and compressors is not often used in connection with self-acting starters, and therefore the series relay type of contactor starter does not find much application for this service.

Leather Trades' Chemists

Forthcoming Conference at Copenhagen

THE 4th joint conference of the International Society of Leather Trades' Chemists (I.S.L.T.C.) and the Internationalen Vereines der Leder Industrie Chemiker (I.V.L.I.C.) will be held at Copenhagen, August 29 to September 2.

Members attending the conference will be received by the president and members of the Danish Leather Trades' Federation. There will also be a reception in the Town Hall by invitation of the magistrates of Copenhagen. Papers to be presented include:—D. Burton: "The Neutralisation of Chrome Collagen Compound as an Internal Complex Salt." A. Dohogne: "Récherches sur la différenciation du cuir à semelles de Tannage Lent et de Tannage Rapide." W. R. Atkin: "The Titration Curves of Gelatin and Collagen." V. Kubelka: "The Chemical Evaluation of Vegetable Tanned Leather." V. Kubelka and V. Nemec: "Influence of Oils and Fats on Iron Tanned Leather." V. Nemec: "The Fractional Extraction of Pine Bark." D. Jordan Lloyd: The Influence of the Reticular Tissue on the Swelling of Collagen in Alkalis." G. Parsy: "Essais de détermination du pH des huiles sulfonées." E. Elöd: "Tanning with Polyvinyl Alcohol." W. Grassmann: "A Nephelometric Micro-Method for Estimating and Differentiating Vegetable Tanning Materials." A. Küntzel: "Gelatinisation Temperature of Leather." A. Miekeley: "The Combination of Sulphite Cellulose with Hide Substance." G. Otto: "The Comparative Dissociation of Synthetic Tannins and Vegetable Tannins." A. Küntzel, C. Riess and H. Erdmann: "Tungsten Tannage." F. Schneider: "Contribution to our Knowledge of Hide Protein." F. Stather: "Currying of Chrome and Vegetable Tanned Leathers." K. Wolf: "A New Electrode for pH Determination."

Salters' Institute Fellowships

Awards for 1937-38

THE following awards for 1937-38 have been made by the Salters' Institute of Industrial Chemistry, and approved by the Court of the Salters' Company:—A fellowship has been renewed to Mr. L. M. Baxt (Imperial College). Fellowships have been awarded to Mr. R. H. Freak (University of Oxford); Mr. A. J. Shorter (University of Birmingham); Mr. J. L. Tuck (University of Manchester) and Mr. S. H. Wade (Imperial College).

The Salters' Institute has also awarded 40 grants-in-aid to young men employed in chemical works in or near London to assist them in their studies.

Joiner's Glue

A New Standard Specification

A NEW British standard specification (No. 745) has been published for "joiner's glue"; it is one of a series dealing with glues, a specification on standard methods of testing glues (No. 647) having been published in 1935. These standards were authorised by the Chemical Divisional Council and prepared in co-operation with the industry. The present B.S. specifications cover various types of glue, such as cake or powder, jelly or liquid, and casein glues, and includes tests for the determination of moisture content, chlorine, reaction, and joint strength in shear. Copies may be obtained from the Publications Department, British Standards Institution, 28 Victoria Street, London, S.W.1, price 2s. 2d. post free.

The Chemical Age Lawn Tennis Tournament

Arrangements for the Finals

BY the kind invitation of Mr. Victor Blagden, chairman of Victor Blagden, Ltd., the finals of the seventh annual CHEMICAL AGE Lawn Tennis Tournament will be held on a hard court in the grounds of Mr. Blagden's house, White Cottage, Sandy Lane, Oxted, Surrey, on the afternoon of Saturday, September 4. Play is due to commence at 3 p.m. promptly and a most convenient train leaves Victoria at 1.28 p.m. (London Bridge 1.38 p.m.), arriving at Oxted station at 2.28 p.m. To reach White Cottage from Oxted Station, a bus leaves the station at 2.35 p.m. for the Bell Inn, Old Oxted (about 1 mile); turning sharp right is Sandy Lane, and the house is on the right hand side of the lane about 300 yards from the inn. For those going by car from London, turn off the Caterham road at Godstone and continue to Old Oxted, where the Bell Inn will be found on the left.

After the close of play, Mr. John Benn, a director of Benn Brothers, Ltd., the proprietors of THE CHEMICAL AGE, will present the prizes to the finalists. THE CHEMICAL AGE cups will be presented to the winners, and again the statuettes for the winners have been graciously given by Thomas Hill-Jones, Ltd., and the statuettes for the runners-up by Mr. W. Lloyd Willey.

A number of invitations have been sent out, and members of the chemical industry wishing to attend should apply for tickets as soon as possible. Applications should be addressed to the Editor, THE CHEMICAL AGE, Bouverie House, 154 Fleet Street, London, E.C.4.

The competition attracted a large number of entrants this year, and judging by the scores in the results of the fourth round, some exciting play should be seen on the finals day.

Fourth Round Results

SINGLES.

C. G. Gough (Lever Bros., Ltd.) beat I. Williams (Monsanto Chemicals, Ltd.), 6-2, 6-3.

R. M. O. Williams (Imperial Chemical Industries, Ltd.) beat A. Baxter (United Yeast Co., Ltd., 6-8, 6-4, 7-5.

L. F. Grape (Borax Consolidated, Ltd.) beat A. W. A. Goudie (Corn Products Co., Ltd.), 7-5, 7-5.

A. H. Tickner (British Celanese, Ltd.) beat A. Cosgrove (Hanovia, Ltd.), 6-3, 6-3.

DOUBLES.

A. E. C. Willshere and L. F. Grape (Borax Consolidated, Ltd.) beat S. E. Chaloner and W. Speakman (Monsanto Chemicals, Ltd.), 6-4, 4-6, 7-5.

G. W. Hole (Anglo-Saxon Petroleum Co., Ltd.) and C. G. Smith (Shell-Mex and B.P., Ltd.) beat R. J. Sleap (United Yeast Co., Ltd.) and F. Darton (J. Buchanan and Co., Ltd.), 6-0, 6-2.

Progress in Transport and Storage of Foodstuffs

Further Applications of Carbon Dioxide Atmospheres

GREAT advances have been made in the past ten years in the carriage of foodstuffs under refrigeration, states the annual report for 1936 of the Food Investigation Board of the Department of Scientific and Industrial Research.

On the basis of the work carried out in the "experimental hold" at the Ditton Laboratory, where the conditions operating in a ship's hold at sea can be imitated, a new system of refrigeration by air-circulation, based on the use of a "jacket," has been developed and widely adopted, in various forms, in new tonnage, and new methods of stowing cargoes of fruit have been devised and tested under commercial conditions. Moreover, the carriage of chilled beef from Australia and New Zealand in gas-storage, *i.e.*, in an atmosphere containing about 10 per cent. of carbon dioxide, following the discovery of this method at the Low Temperature Research Station, has developed rapidly. In these circumstances steps are being taken to secure data on the performance of these modern methods, and in co-operation with the Councils for Scientic and Industrial Research of Australia and New Zealand an expedition is leaving for New Zealand and Australia in January, 1938, to study conditions in spaces carrying frozen meat, chilled beef in gas-storage, cheese and fruit.

One of the most important achievements of the work of the department on the storage of fruit has been the development of gas storage. In this method the atmosphere of the store is altered to contain more carbon dioxide, and less oxygen, the correct proportions for any variety of fruit being carefully determined by experiment. The latest work on the gas-storage of pears seems to indicate that there is scope for a considerable increase in the home production of pears for which technical information both as regards production and storage is now available. It appears from the results of the investigations carried out at the Ditton Laboratory during the past few years that the pear responds even more favourably than the apple to gas-storage. After removal from gas-storage the fruit ripens more slowly, and therefore allows more time for marketing, than fruit that has not been thus stored.

"It is clear," states the report, "that constant and intimate co-operation between, on the one hand, the Agricultural Research Council and the Departments of Agriculture, who are concerned with production, and ourselves, on the other hand, is essential to progress over a large part of the range of home agricultural products."

Among its other work on the storage of eggs, the quality of eggs stored at 0° C. in atmospheres containing different concentrations of carbon dioxide is being investigated by candling, by tests for palatability and by the usual chemical and physical tests for the white and yolk. The results so far confirm that an atmosphere containing 2½ per cent. of carbon dioxide improves the quality of the egg, notably in the yolk. Atmospheres containing high concentrations of carbon dioxide, in the range 60 to 100 per cent., affect the quality of eggs uniformly, the yolks being firmer and the whites markedly more liquid than in eggs stored in air. Eggs have been stored in saturated atmospheres within this range for eight months without spoilage by mould or bacteria.

It has been known for some years that eggs retain their fertility longest if they are stored at a temperature of 10° to 12° C. Experiments during the past year have indicated that, at 10° C., the period of fertility can be still further prolonged if the atmosphere contains 2½ to 5 per cent. of carbon dioxide.

Investigations on the preservation of fish show that "herring cured with much less salt than is now employed keep well for six months at −3° C., a temperature usual in the storage of salt-cured herring." Experimental evidence indicates that the rancidity that develops in herring's fat during cold storage is due to enzymes. These are activated by common salt, and this explains the rapidity with which herring that have been initially frozen in cold brine develop a rancid flavour during storage, particularly if left unglazed.

Reviews of New Technical Books

QUANTITATIVE ANALYSIS. By Willis Conway Pierce and Edward Lauth Haenisch. pp. 412. London: Chapman and Hall, Ltd. 15s.

Apart from becoming familiar with the more common analytical procedures and their applications, the students of analytical chemistry must also develop a certain degree of technical skill. In addition he should understand the theoretical principles upon which the analytical methods are based and be capable of attaining accuracy in the stoichiometric calculations which are involved in an analysis. Finally, the well-trained analyst should have a knowledge of the precision and accuracy which is to be expected and of the errors which may be encountered in each determination. All of these points the joint authors of this book have attempted to correlate. Each topic is introduced by a brief description of the methods to be used and a simplified explanation of the theory involved, and this is followed by a presentation of the stoichiometry of the theory involved, and finally by the laboratory procedures. Each procedure, moreover, is followed by a section of explanatory notes which serve to show more clearly the relationship of theory and practice, and also emphasise the need for special precautions.

SYNTHETIC RUBBER. By W. J. S. Naunton. pp. 159. London: Macmillan and Co., Ltd. 7s. 6d.

This is the first book on synthetic rubber to be published since the monograph by S. F. Schotz in 1926, which dealt only with the chemical aspects of the subject. As head of the rubber laboratories of Imperial Chemical Industries, Ltd., and honorary technical adviser to the Institution of the Rubber Industry, the author speaks with authority on the technical advances and the changes in industrial outlook and policy which in the last ten years have made the large-scale production of synthetic rubber practically possible and economically desirable. Three chapters which summarise the history, economics, and future outlook of synthetic rubber generally should be useful and of interest to the technically-minded reader, and also to the layman seeking to rationalise the claims put forward for the various synthetic rubbers now being produced abroad. A subsequent chapter on "The Borderland between Rubber and Resins" gives an interesting correlation of the chemical structure of rubber with its well-known useful properties, and shows the background to the research which has led to the reproduction and improvement of these properties. The chemistry of synthetic rubber is also discussed with special reference to chloroprene polymers such as "Neoprene," on the basis of the methods of the large-scale production of the parent hydrocarbon and its polymerisation to the final rubber. A separate chapter is devoted to the special physics associated with the production of synthetic rubber, whereby the mechanism of polymerisation and the structure and physical properties of the polymer have been elucidated. The purely technical section of the book is rounded off by a discussion of the chemistry, properties and applications of synthetic rubber latex. There are some excellent photographs illustrating steps in the manufacture of Neoprene and plant for its processing

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THE NEWER ALCHEMY. By Lord Rutherford. pp. 67. Cambridge University Press. 3s. 6d.

This book tells of the transmutation of the elements, how it is done and what it means, and it contains in expanded form the subject matter of the Henry Sidgwick Memorial Lecture delivered at Newnham College in November, 1936. Since the early days of radioactivity, the problem of transmutation has occupied much attention on the part of the author, who states that recent advance "has been due to the development of new and powerful methods of attack." He gives a brief account of new apparatus and methods which are in use in laboratories throughout the world, and in the matter of illustrations there are thirteen plates with long explanatory captions.

EVERYDAY SCIENCE. By A. W. Haslett. pp. 354. London: G. Bell and Sons, Ltd. 7s. 6d.

In this book the author has endeavoured to show the manifold ways in which science affects our lives at every turn. Starting in the house itself, he deals with the problems of refrigeration by gas and electricity, of heating and lighting; new questions of diet and cooking; and the still continuing search for new materials. Building, crime-detection, transport and agriculture also provide subject matter, especially in relation to the growing knowledge of plant needs, the fight against disease and insects, and the breeding of new varieties. The author's aim throughout has been to show how each practical application of science has its place in the general story of discovery.

Indian Chemical Industry

Increased Demand for Bitumen

UNDER direct encouragement from the Government, an important company is being formed in the Travancore State in South India to combine the sugar distillery and pharmaceutical industries. The by-products of the sugar industry will be utilised for the distillery, and the by-products of the distillery for pharamaceuticals.

The chemical industries of Mysore showed good progress last year. More than 150,000 gallons of bitumen were manufactured in the Government Industrial and Testing Laboratory at Bangalore. In view of the greater demand for this product additional plant is being erected. In the lac factory the manufacture of insulating varnishes and paints having a lac base has been successfully taken up to supply the demand from public works departments, electrical supply undertakings, and the railways.

The Assam Government is thinking of establishing a large distillery plant to consume the molasses which is produced in the sugar industry. Power alcohol will be made for use as a cheap substitute for petrol, the production of which was recently recommended by the Sugar Committee of the Imperial Council of Agricultural Research.

Official Statistics

An Index of Available Publications

CONSPICUOUS among the various public services which are provided directly by the State is the publication every year by H.M. Stationery Office of a very large number of volumes containing statistics collected through official channels. The range of the subjects dealt with is so wide, and the degree of detail in which they are examined so varied, that this store of information cannot be utilised to the best advantage without a single systematic index to the contents of all statistical publications of this nature. Such an index has been in existence for a number of years, a new volume, dealing with the statistics published in the preceding year, being issued annually. From this index, the nature of the information available on any subject, and the official publication in which it is contained, can be readily ascertained.

The title of this extremely useful handbook is "The Guide to Current Official Statistics." The 15th issue, relating to the official statistics published in 1936, has just been published. It contains over 400 pages, and is obtainable from the sale offices of H.M. Stationery Office, or through any bookseller (price 1s.).

The Use of a Modern Scientific Library

By

W. P. DREAPER, O.B.E., F.I.C.

THE conclusions obtained as a result of three years' investigation into the use of a modern scientific library may have some interest to those who still find difficulty in securing correct information upon the work carried out by others, so far as it has been published in scientific journals.

In the case of large trading organisations who engage on research as part of their activities, this matter of knowledge presents exceptional difficulties. These difficulties may be met by setting up a separate department—a library staffed with those capable of doing library routine work. Experience has shown, however, that this method may only bring partial success, unless the library be one dealing with a particular manufacture. Experience has also shown that when, in the first instance, knowledge of scientific literature is sought in bibliographical form, the only safe procedure to-day is that the library-unit should contain not less than 250,000 books and 10,000 journals. Even then difficulties may arise which call for further work in related libraries. The time taken to collect such a library, apart from the question of cost, runs into years. The matter of providing a bibliography of general scientific information may take even longer. Then there is the question of staff. In addition it is no use having a first-class collection of books and journals, properly housed, unless a highly technical staff is available to work in conjunction with it. Even then, so far as a bibliography is concerned, a system of classification must be adopted which will enable the library to keep in touch with other leading libraries.

Unrelated Facts Still Available

What this may amount to in practice may be gathered from a recent estimate based on the Science Library. It would seem that each year 750,000 worth-while papers and articles are published in 15,000 scientific and technical journals in the civilised world. Out of this number no more than 250,000 are actually recorded bibliographically by the combined efforts of the world's libraries and scientific institutions. About 500,000 therefore remain unnoticed in these 15,000 journals, and they are past recovery unless special efforts be made in the future to salve them. Another interesting fact is being revealed by an experiment in bibliography production carried on by the Central Agricultural and Scientific Bibliography (C.A.S.B.), *i.e.*, it is shown that there exists a quite unexpected mass of literature on one subject in journals which ordinarily have nothing to do with this subject.

The user of scientific literature has therefore two ways open to him when carrying on research. First, to rely upon his own initiative and confine his search to a selected number of journals with which he is acquainted; alternatively to rely upon a more general search carried out by others who have special knowledge of this kind of work, for instance, work carried out by an institution like C.A.S.B. In its complete form this entails the completion of a world wide bibliography on the special subject under review. It also means sooner or later the question of indexing in bibliographical form all papers and articles of moment.

Duplication of Research

Under existing circumstances it is no uncommon thing to find that the same research has been carried out by a previous worker. In extreme cases the work undertaken may have been carried out several times previously. This would have been impossible if an efficient and proper bibliographical index had been available. How, then, can a worker make certain that similar conditions do not apply to his own work? Generally speaking he cannot do this with certainty.

This personal search after bibliographical information is one of a special kind. It obviously entails among other qualifications a working knowledge of a great number of languages. Where shall the search begin, and will the searcher find in the library selected a good working bibliography of the subject matter present there in books or journals. The reply may safely be in the negative. As an example, the Science Library is supposed to contain some 40,000,000 references of a useful character, but its bibliography contains about two million references as these are added at the rate of some 150,000 per annum. The remaining ones must be searched for specially.

Recognition of Past Work

Ethically this seems an important operation; practically it is equally important. I have already suggested that at some time in the future a reader of a paper should refer by number to a bibliography covering the subject of his research. This system might be started up easily at the present juncture in individual cases.

Another point which might be argued against the reliance on a bibliography is at first sight important. How can investigators use bibliographies which were so complete, for these would necessarily be of enormous size? The answer is a simple one. At present there is for those working the decimal classification a very detailed index which has been worked out and which is kept up to date in Paris. It is only necessary to increase the number of divisions and sub-divisions to keep each bibliography within reasonable bounds. Actually in practice a bibliography on any special subject may be fairly complete if it contains not more than 300 references. There are exceptions, of course, and some run into thousands of references; but in such cases the subject dealt with is a wide one, and one which can be sub-divided. A bibliography may be small, not because it is incomplete, but because it deals with a restricted subject.

A Time-saving Device

When the worker in science once realises that, given a satisfactory bibliography to his subject, his subsequent work is greatly simplified and ensured against the defect of repetition, the position will be clarified and real progress will be possible. The presence of a mass of unrelated facts and scientific data is gradually forcing the research worker to a position where either the quality of his work must suffer or he must be provided with useful bibliographies which cover the area of his activities. Because of this last condition the library-unit must be of the size suggested.

Another point which might be brought out in a bibliography devoted to technical matters is that there should be some indication as to which references might be specially useful. Here we tread on dangerous ground, as every practical worker will realise. In a works with a scientific staff numbering twenty or more, this problem would be best dealt with by one or more members in particular.

Experience seems to indicate that the user of information will be best served when he secures his information from a library-unit containing not less than 250,000 books, 10,000 journals, and, in the case of technical work, a numerous collection of pamphlets also properly classified. Behind this there should be present for special work a further five other equally large library-units to which bibliographies prepared in the first instance might be referred for further elaboration and completion.

Far more use should be made of bibliographies. The investigator who will look into the position more deeply will find many reasons. Their preparation brings in team-work and collaboration first on national lines, and then on international lines, a useful quality in itself. In time all must realise that they are working together in a common task, those who prepare the ground for further work and those who then carry it out.

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Pine Oil Emulsions as Disinfectants

The Importance of the Phenol Coefficient

ALTHOUGH the germicidal properties of pine oil have been a subject of study in America for some years, little or no work on this aspect has been done in Britain. Pine oil emulsions, however, are germicidal to typhoid, diphtheria, cholera and many other diseases, and they have the advantage of being non-poisonous.

The oil is obtained by steam distilling and solvent extraction using old dead stumps of various species of pine trees found chiefly in the coastal plain of the Southern States of America. These stumps are broken down to small chips before use. The crude steam distilled pine oil taken off between 170° and 350° C. is a complex mixture of liquid terpenes, including hydrocarbons, alcohols, ketones, aldehydes and phenols, and is further fractionated to yield different grades of pine oil each having its own particular use; "Newport heavy white" is a fraction which is very suitable for disinfecting purposes.

Emulsifying Bases

Pine oil, being insoluble in water, has to be prepared in the form of an emulsion for disinfectant use, and there appears to be no unanimity as to which is the best emulsifying base for this purpose. It may be that the hardness of the water affects the efficiency of the various bases to a different degree. Soaps and soluble oils are the two main types of bases used. With a soap base, either the soap may be added to the oil, or the requisite amount of fatty acid may be added and then neutralised by caustic solution. Using the latter method no heat is required, but a darker product results. Opinions vary as to which constituents of the oil are most easily emulsified, some writers maintaining that the higher the alcohol content the more difficult is the emulsification, but the very reverse of this is also argued. The homogenisation should be as efficient as possible for the bacteria are killed by the absorption of the fluid and the finer the state of subdivision the more readily does absorption take place.

The phenol coefficient of disinfectants may be lowered by the presence of such substances as acids and alkalis due to osmotic pressure effects on the bacterial cells, but with a pine oil disinfectant any excess of these substances would affect its stability and clarity so they are unlikely to be present. The possibility of adding fortifying agents to increase the phenol coefficient does not seem to have been considered.

Constituents

The main constituents, with their boiling points, of steam distilled pine oil are:—Dipentene (175° C.), α-terpinene (179° C.), terpinolene (183° C.), fenchyl alcohol (202° C.), camphor (204° C.), dihydro-terpineol (209° C.), borneol (212° C.), α-terpineol (218° C.), di- and poly-terpenes (240-350° C.).

The phenol coefficients as found for the various types do not always agree, but speaking roughly it may be said that the hydrocarbons have no germicidal value since their coefficient never exceeds one, while the alcohols have high coefficients—4.5 to 10. Camphor is the only ketone present to an important extent and like the alcohols it has a high phenol coefficient. The only phenol present is carvacrol, and as it is less than 1 per cent. of the oil its effect on the germicidal properties is negligible. Since the di- and poly-terpenes comprise a fraction whose boiling point varies, it is impossible to put a figure to their phenol coefficient but it is unlikely that they are of much use in this respect. In short, from the point of view of disinfectant and emulsifyable properties an oil containing a high percentage of alcohols is desirable, with as low a percentage of hydrocarbons as possible, because the germicidal properties of the hydrocarbons are poor and they increase the emulsification difficulties.

Personal Notes

MR. A. H. JOHNSON has been elected a director of the Oxley Engineering Co., makers of chemical and gasworks plant.

MR. BENJAMIN JOSEPH FLETCHER, retired works chemist, of Pollokshields, Glasgow, has left personal estate valued at £14,604.

MR. GEORGE BIRRILL CRUICKSHANK, jun., of Handsworth, chemical manufacturer, has left estate valued at £9,456, with net personalty £9,172.

MR. F. H. MALPRESS has been awarded a three-year research scholarship in nutritional chemistry on the recommendation of the Agricultural Research Council.

SIR WILLIAM EDGE, chairman of William Edge and Sons, Ltd., chemical manufacturers, has been appointed a director of the Federated Employers' Insurance Association.

PROFESSOR A. M. PARKER, of the chair of chemistry, in the University of Manitoba, to which he was appointed in 1904, is retiring.

MR. LEONARD ROPNER, of Stockton, whose death was announced in THE CHEMICAL AGE last week, was a director of the Raisby Hill Limestone Co., Ltd., and Sadler and Co., Ltd., Cleveland Chemical Works, Middlesbrough.

MR. J. E. O. LITTLE has been appointed chief chemist and metallurgist to Clonfield and Kennedy, Ltd., Kilmarnock, in succession to Mr. F. Hudson. Mr. Little was formerly assistant at the L.N.E.R. Works, Doncaster, and prior to that he was in charge of Perlit iron production at the Caledon Shipbuilding and Engineering Co., Ltd., Dundee.

MR. M. G. DEACON has resigned office as a director of Lewis Berger and Son, Ltd., paint and varnish manufacturers.

MR. BENJAMIN IRVING has been elected to a seat on the board of Worthington-Simpson, Ltd., pump manufacturers.

MR. EDWARD GEORGE STAFFORD, who has been associated with the Slag Reduction Co., Ltd., of London, for over thirty years, has died in a Sheffield nursing home, at the age of 54.

MR. ALASDAIR MCKELVIE, who was formerly with the West African Drug Co., Ltd., has received the degrees of M.B. and Ch.B. at Edinburgh University.

ALDERMAN HARRY HYDE, of Ashton-under-Lyne, who came to Ashton in 1897 and commenced business as a wholesale druggist and drysalter, is one of the new Justices of the Peace for Lancashire.

PROFESSOR HENRY EDWARD ARMSTRONG, D.Phil., LL.D., D.Sc., F.R.S., of Lewisham, emeritus professor of chemistry at the City and Guilds College, South Kensington, left estate valued at £16,369, with net personalty £15,849.

SIR ERIC CAMPBELL GEDDES, of Albourne Place, Albourne, chairman of the Dunlop Rubber Co., Ltd., W. Goodyear and Sons, Ltd., and a number of other companies, left £100,432 (net personalty £30,078).

MR. F. R. BANKS is to be assistant secretary of the Ethyl Export Corporation. He has been in charge of the technical work of the corporation since 1930. He was previously connected with the technical department of Anglo-American Oil Co.

MR. J. H. AIKEN, who for so many years has filled the part-time post of general secretary to the Oil and Colour Chemists' Association, in addition to his regular occupation with the Institute of Chemistry, has found it necessary to intimate his desire to relinquish his duties under the Association. The change will take place at the end of October, 1937. The necessary steps to fill the vacancy caused by Mr. J. H. Aiken's resignation will be considered at the next meeting of the Council of the Oil and Colour Chemists' Association.

MR. JOHN HENRY CURRY, who has been secretary of Sunderland Gas Co. for the past seven years, has died at Wearholme, Sunderland, a month after his appointment to the general management of the concern. He was 54 years of age. Mr. Curry was in the service of the Newcastle and Gateshead Gas Co. for 27 years, rising to the post of distribution superintendent, and then became secretary of Sunderland Gas Co. He was appointed to the dual post of general manager and secretary when Mr. C. Drury retired last month.

SIR DAVID ORME MASSON, F.R.S., professor of chemistry in the University of Melbourne for 37 years and one of the leading scientists in Australia, has died at Melbourne at the age of 79. He was educated at Edinburgh University, where his work as a research fellow included the determination of the chemical constitution of nitro-glycerine, which up to that time had not been settled. He went to Melbourne University in 1886. Elected a Fellow of the Royal Society in 1903, he became president eight years later of the Australian Association for the Advancement of Science, and during the war was a valuable member of the Commonwealth munitions committee, in addition to being chairman of the Commonwealth advisory council on science and industry. From 1923 to 1934 he was president of the Australian Chemical Institute and for four years of that period president of the Australian National Research Council. He leaves one son—Dr. James Irvine Orme Masson, who is professor of chemistry and head of the department of pure science at Durham University — and one daughter.

DR. J. FERGUS SMITH has been appointed chief chemist of the Guard Bridge Paper Co., Ltd., Fife, in succession to Major J. Edington Aitken. Dr. Smith was formerly assistant chemist with Bowater's Paper Mills, Ltd., and prior to that he had been with the Canadian International Paper Co., Ltd.

MR. THOMAS R. A. BEVAN has been elected a vice-president of the Ethyl Export Corporation, foreign subsidiary of the Ethyl Gasoline Corporation, United States. Mr. Bevan will continue as manager of the London office of the Ethyl Export Corporation, a post which he has occupied for the past ten years. Prior to joining the Ethyl Corporation, he was associated with the Anglo-American Oil Co., Ltd.

MR. FERDINAND AUGUSTUS NETTELL, one of Swansea's best-known metallurgical chemists, died last week at his home at Mumbles, at the age of 56. He was associated with Vivian's Copper Works as metallurgical chemist for many years before going to Spain in 1922, where he was engaged in copper mining. He returned to this country at the outbreak of the Civil War.

MR. G. LAMBERT was the winner of the British Glues and Chemicals Sports Club's cross-country run for the "Gardiner" Challenge Cup on July 29. Mr. J. Green, the club's general secretary, who finished second, is shortly leaving Newark for another branch, and was afterwards presented with a dressing case from the firm's employees and a week-end case from the staff.

SIR EDWARD DAVSON, Bt., died on August 7, aged 62. He was chairman of the British Empire Producers Organisation, and represented the Colonies and Protectorates on the Imperial Economic Committee He acted as Government adviser on colonial trade at the Ottawa Conference in 1932, and in the following year attended the World Economic Conference in a similar capacity. He was the founder and first president of the Associated Chambers of Commerce of the West Indies.

Chemical Notes from Foreign Sources

Denmark

A NEW FACTORY FOR THE PRODUCTION OF VITAMINS and vegetable extracts is being built by the Ferrosan A/S of Gladsachse, at a cost of 250,000 kronen.

Germany

INVESTIGATION OF PROSPECTS OF FOREIGN ORE DEPOSITS is to be carried out by the Gesellschaft zur Erforschung ausländischer Erzvorkommen m.b.H., with a capital of 500,000 marks. Its first task will be the examination of certain Jugoslavian ores.

Holland

MANUFACTURE OF TRICHLORETHYLENE, not previously made in Holland, has been commenced by the N.V. Electro Zuur- en Waterstoffabriek.

Italy

A PLANT FOR MAKING SYNTHETIC RADIO-ACTIVE SUBSTANCES is to be erected on behalf of the Institute of Public Health, with the aid of a state grant of 300,000 lire.

A MARKED EXPANSION IN ITALIAN ALCOHOL PRODUCTION may be expected in the near future following the authorisation granted to many producers to lay down additional plant.

NEW CHEMICAL UNDERTAKINGS recently authorised by the government include:—Production of sodium silicofluoride (C. & G. Marchi fu Ferruccio of Florence); enlargement of potassium bromide plant (Società Italiana del Bromo of Rome); erection of a bone-degreasing plant (Trivini Bellini and G. Simoni of Mantua); erection of rosin and turpentine plant (S.A. Industrie Resine Italiane of Rome); construction of factory for vinyl resin manufacture (Società Elletrochimica del Toce of Milan); installation of plant for making derivatives of ethylene oxide, thiodiglycol and ethylene diamine (Società Italiana Acetilene Disciolto of Bergamo).

Japan

SODIUM CYANIDE IS TO BE MANUFACTURED at a new factory of the Nippon Soda K.K. at Nihongi.

PHTHALIC ANHYDRIDE MANUFACTURE has been commenced by the Chosen Sekitan Kogyo K., at Eian (Korea).

PRODUCTION AND REFINING OF SULPHUR will be undertaken by the newly-formed Yonezawa Kogyo K.K. (capital 500,000 yen).

WITH THE OBJECT OF EXPLOITING NATURAL GASES in Formosa, the Formosa Chemical Industry Co. has recently been formed and will produce benzole, petrol and ammonium sulphate among other materials.

Jugoslavia

POTATO STARCH IS TO BE MANUFACTURED at a factory to be built at Virovitica by the Association of Potato Growers.

Poland

A SYNTHETIC WOOL-LIKE MATERIAL known as "Welnotit," and forming the subject of a recent Polish patent, is to be produced from agricultural waste products.

Switzerland

NEW CHEMICAL companies include:—Rippstein & Co. A.G. at Arlesheim (capital 50,000 francs), manufacturers of pharmaceutical, etc. chemicals; Laboratori Rubor S.A. at Lugano (capital 15,000 francs), pharmaceutical specialities; Etablissement Edouard Fulliquet S.A. at Lancy (capital 150,000 francs), oil and fat refiners.

From Week to Week

A SMALL FIRE BROKE OUT at the Royal Ordnance Factory, Irvine, Ayrshire, on August 7, and resulted in a small explosion, but no one was injured.

A PROPOSAL IS UNDER CONSIDERATION by the Netherlands East Indies Government to grant a contract to the Batavian Petroleum Co. for the prospecting and exploitation of oil products in an area of some 2,500 square miles in Western Java.

AS AN EXCEPTION TO RESTRICTIONS on the import of certain chemical fertilisers into France and certain French colonies, samples of phosphatic and potassic fertilisers weighing less than 100 kilos. may now be imported without licence, until further notice.

OZONOL LABORATORIES (1930), LTD., disinfectant manufacturers, of 7-9 New Wharf Road, N.1, have increased their nominal capital by the addition of £1,000, beyond the registered capital of £2,000. The additional capital is divided into 1,000 "A" 10 per cent. cumulative preference shares of £1 each.

A NEW METHOD FOR THE RECOVERY OF FLOTATION SULPHUR has been developed by the Rochester Gas and Electric Corporation of the United States. Hydrogen sulphide is removed from the gas by scrubbing with a sodium thioarsenite solution. By blowing air through this foul solution, flotation sulphur is recovered. The product is largely used by farmers for insecticidal and fungicidal purposes, with particular success in apple orchards.

IMPERIAL CHEMICAL INDUSTRIES, LTD., has taken an interest, with A. Reyrolle and Co., electrical engineers, in Pyrotenax, Ltd., a new cable-making concern. The I.C.I. interest is under 30 per cent. and Reyrolle's is understood to be approximately 33⅓ per cent. Pyrotenax is to manufacture fireproof cables under patent rights acquired from French interests. I.C.I. is to supply the necessary copper tubing and copper wire. The works of Pyrotenax are situated at Hebburn-on-Tyne and production will commence shortly.

EXEMPTIONS FROM GENERAL INCREASE OF IMPORT DUTIES (13 per cent.) in respect of the recent Franco-German Commercial Agreement are announced in the *Board of Trade Journal*, as applying to phosphate of ammonia (except for agriculture or fertiliser manufacture), nitrate of ammonia for industrial purposes, sulphide of carbon, sodium-free cyanide of potassium, sulphuric acid, oxides of lead, caustic potash, urea and vulcanisation accelerators.

FIVE CHEMISTS WERE AFFECTED BY FUMES from a cylinder of chlorine in the research laboratory of the Bleachers' Association, at Blackfriars House, Manchester, on August 6, while the cylinder was being lowered into the River Irwell by means of a rope. The cylinder was found to be leaking when in the laboratory earlier in the day, due to the valve having become jammed, and it was therefore decided to place it in the river until the supply of gas was exhausted. Oxygen breathing appliances had to be obtained from the Manchester Fire Brigade to allow the staff to enter the laboratory to remove the cylinder.

THE AYRSHIRE MINING VILLAGE of Bartonholm has been acquired by Imperial Chemical Industries, Ltd., as a site for an explosives factory in addition to the Ardeer works.

A REPRESENTATION HAS BEEN MADE to the Board of Trade under Section 10(5) of the Finance Act, 1926, regarding Pyridine distilling not less than 90 per cent. between 113° and 117° C. Any communications should be addressed to the Principal Assistant Secretary, Industries and Manufactures Department, Board of Trade, Great George Street, London, S.W.1, not later than August 21.

GERMANY'S SUBSIDISED COAL EXPORTS into British markets are causing considerable alarm in the British coal industry. According to the official German Trade Returns, issued this week, exports of cargo coal from Germany during the first six months of 1937, show an increase of 5.4 million metric tons, or 40 per cent. over shipments in the corresponding period of 1936, and 6.8 million metric tons, or 57 per cent. over the corresponding period of 1935. Exports rose sharply to practically all markets, deliveries to the Mediterranean and South America, and to France, Belgium and the Netherlands being exceptionally heavy.

ARISING OUT OF CLEARING AND OTHER AGREEMENTS concluded by Belgium with certain European countries certain goods when imported into Belgium and Luxembourg from the United Kingdom must now be accompanied by a certificate of origin. Further particulars can be obtained from the Department of Overseas Trade, 35 Old Queen Street, London, S.W.1. Chemical and mineral material affected include heavy spar (natural sulphate of baryta, barytine) unworked, also ground; Iceland spar; and cryolith (fluoride of aluminium and sodium); magnesite (carbonate of magnesia, lemolite or dolomite) in the natural state; witherite (carbonate of baryta); natural crude potash salts, even crushed or ground (carnallite, kainite, sylvanite and the like); sulphur; mercury; carbide of calcium; cyanamide of lime; sulphate of potassium; and tanning extracts.

ASHTON SAW MILLS, LTD., sawmill proprietors, manufacturers of and dealers in packing cases, containers, etc., has changed its name to Ashton Containers, Ltd.

SCOTT BADER & CO., LTD., have published a booklet dealing with the preservation of wood with special reference to Curgon copper and zinc naphthenates. A special copper naphthenate is available for preventing attack by white ants.

THERE WAS A FURTHER FALL IN ZINC STOCKS in the United States during July. According to figures issued by the American Zinc Institute, the total stock is now only 13,561 short tons. Production during the month was 49,181 tons, against 50,526 tons in June; deliveries totalled 49,700 tons, against 50,200 tons.

MANESTY MACHINES, LTD., manufacturers of automatic water stills and tablet compressing machines, have removed from Manesty Buildings, College Lane, Liverpool, 1, to new works at Speke Hall Road, Liverpool, 19. Telephone: Garston 1511; telegrams: "Manesty, Liverpool."

BERRY WIGGINS AND CO., LTD., manufacturing chemists, Tensuiam House, Water Lane, Stratford, E.15, have increased their nominal capital by the addition of £150,000 beyond the registered capital of £430,000. The additional capital is divided into 150,000 6 per cent. second cumulative preference shares of £1.

EXTENSIONS TO THE RECREATION CLUB of Imperial Chemical Industries, Ltd., were opened on August 6. Mr. J. Rogers, a director of I.C.I., who is more immediately concerned with welfare and labour activities, officiated, and was presented with a commemorative key by the contractors. Mr. E. A. Vincent, chairman of the club, expressed thanks to the General Chemical Group.

THE FIRST YUGOSLAVIAN ALUMINIUM FACTORY has been opened at Losovac, near Sibenik. It has a capacity of 1,000-2,000 tons a year. In 1936 Yugoslavia imported raw aluminium, mainly from Germany, valued at 4,000,000 dinars. The Concordia Co. proposes to establish an aluminium factory in Roumania. It will cost 300,000,000 lei and will be the second biggest in the Balkans.

THE SATURN OXYGEN CO., LTD., of London, are to erect a plant at Thornaby-on-Tees for the extraction of oxygen from the air. This plant will be the first of its kind in Great Britain. It is to be erected on part of the former shipyard of Richardson, Duck and Co. Part of the contract, including that for storage tanks, has been obtained by Stockton Chemical Engineers and Riley Boilers, Ltd.

Investigation of the Electro-Deposition of Tin

Additions to Acid Baths

ALTHOUGH acid baths for the electro-deposition of tin are attractive because of their high efficiency and the fact that they can be worked at room temperature, they suffer from the disadvantage that they are unstable solutions and the deposits tend to be patchy and in loosely adherent needles. To some extent, however, addition agents enable these drawbacks to be overcome.

Further research to improve these "addition agents" has been carried out on behalf of the International Tin Research and Development Council which has just published the results in their Technical Publication A56. (The Electro-deposition of Tin from Acid Sulphate Solutions, by A. W. Hothersall and W. N. Bradshaw). In this paper it is shown that additions of sulphonic acids, such as those of cresol, phenol or benzene are ineffective when the acids are pure. Crude qualities, however, contain certain by-products of sulphonation which enable smooth deposits to be obtained especially when gelatin is present, but the solutions deteriorate rapidly and have poor covering power. Hydroxy compounds of the aromatic hydrocarbons, such as β-naphthol and resorcinol are most effective and they can be used with gelatin or the more stable lysalbic acid which is prepared from egg albumen. A solution was found which had good covering and throwing power and was substantially unimpaired after long use.

Copies of this publication may be obtained free of charge from the International Tin Research and Development Council, Manfield House, 378 Strand, London, W.C.2.

Inventions in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Applications for Patents

PRODUCTION OF HEAVY METALS.—C. A. Bolton. (Luxemburg, Sept. 26, '36.) 20790.

METHOD OF PREPARING HARD SUBSTANCES OF HARD METALS.—C. A. Bolton. (Germany, Oct. 10, '36.) 20791.

ADHESIVES.—A. Carpmael (I. G. Farbenindustrie). 20348.

MANUFACTURE OF TETRACYCLIC DERIVATIVES.—A. Carpmael (I. G. Farbenindustrie.) 20828.

PRODUCTION OF MONO-AZO DYESTUFFS.—Compagnie Nationale de Matières Colorantes et Manufactures de Produits Chimiques du Nord Réunies. (France, July 23, '36.) 20409.

PLASTICISATION OF RUBBER.—Consolidated Rubber Manufacturers, Ltd., and F. N. Pickett. 20533.

SOAP.—H. A. Couchman. 20305.

TREATMENT OF WASTE LIQUORS.—Courtaulds, Ltd. 20911.

MANUFACTURE OF PIGMENTED COMPOSITIONS.—E. I. du Pont de Nemours and Co. (United States, July 22, '36.) 20379, 20380.

AZO COMPOUNDS.—E. I. du Pont de Nemours and Co. (United States, July 22, '36.) 20381.

MANUFACTURE OF AZO DYESTUFFS.—E. I. du Pont de Nemours and Co. (United States, July 22, '36.) 20382.

ELECTRODEPOSITION OF METALS.—E. I. du Pont de Nemours and Co. 20487.

PRODUCTION OF BORON HALIDES.—E. I. du Pont de Nemours and Co. (United States, Aug. 5, '36.) 20825.

MANUFACTURE OF VISCOSE ARTIFICIAL SILK.—W. W. Groves (I. G. Farbenindustrie.) 20885.

GELATINE RELIEFS FOR PRINTING.—I. G. Farbenindustrie. 20749.

SYNTHETIC SPINELS.—I. G. Farbenindustrie. (Germany, July 29, '36.) 20765.

CELLULOSE DERIVATIVES COMPOSITIONS.—Imperial Chemical Industries, Ltd. 20824.

LUBRICATING OILS.—Imperial Chemical Industries, Ltd., and H. W. Brownsdon. 20933.

CONDENSATION PRODUCTS.—G. W. Johnson (I. G. Farbenindustrie.) 20360.

MANUFACTURE, ETC., OF BUTADIENE.—G. W. Johnson (I. G. Farbenindustrie.) 20623.

THERMOPLASTIC, ETC., SUBSTANCES.—G. W. Johnson (I. G. Farbenindustrie.) 20624.

MANUFACTURE OF SULPHONATION PRODUCTS.—G. W. Johnson (I. G. Farbenindustrie.) 20766.

REGENERATION OF CATALYSTS.—G. W. Johnson (I. G. Farbenindustrie.) 20767.

MANUFACTURE OF CARBON COMPOUNDS.—G. W. Johnson (I. G. Farbenindustrie.) 20768.

MANUFACTURE OF OLEFINES, ETC.—G. W. Johnson (I. G. Farbenindustrie.) 20769.

MANUFACTURE OF DERIVATIVES OF AMINO-BENZONITRILE.—G. W. Johnson (I. G. Farbenindustrie.) 20908.

MANUFACTURE OF ACETALDEHYDE.—J. L. Lush, and E. Newmann. 20446.

CRACKING OF HYDROCARBONS.—W. A. Macfarlane. 20626.

RECOVERY OF IRON from iron-containing materials.—M. McGuinness. 20540, 20810.

PURIFICATION OF WASTE LIQUORS.—E. Maier. (Switzerland, July 29, '36.)

RECOVERY OF BENZENE, ETC., from coal gas, etc.—H. C. Mann. 20365.

BENZYL-OXYALKALYL AROMATIC SULPHONATES.—Mellon Institute of Industrial Research. (United States, April 26.) 20601.

ORGANO-METALLIC COMPOUND for addition to motor fuels, etc. J. J. Michaëlis. 20478.

DEHYDRATING NATURAL CELLULOSE FOODSTUFFS.—J. Cofman-Nicoresti. 20717.

ARTIFICIAL RESINS.—A. Nowack, A.-G. (Germany, Aug. 3, '36.) 20643.

SYNTHETICALLY PREPARING AN ESTROGENIC COMPOUND.—Parke, Davis and Co. (United States, Aug. 6, '36.) 20936.

PROCESS FOR DISPOSAL OF WASTE PICKLE LIQUOR.—P. Parrish. 20935.

PRODUCTION OF VALUABLE HYDROCARBON PRODUCTS.—H. E. Potts (International Hydrogenation Patents Co., Ltd.). 20292.

PROCESS TO RENDER COMBUSTIBLES FIREPROOF.—O. Routala. (Sweden, Feb. 2.) 20861.

PREPARATION FOR REMOVING GREASE from hair, etc.—E. Stern-Rubarth. 20754.

MANUFACTURE OF NEUTRAL COLLOIDAL CALCIUM CARBONATE.—T. Shiraishi. 20786.

DYEING OF ARTIFICIAL SILK.—Soc. Anon. Industrie Chimiche Barzaghi. (Italy, Aug. 3, '36.) 20385.

PREPARATION OF A MANDELATE OF HEXA-METHYLENETETRAMINE.—Soc. des Usines Chimiques Rhone-Poulenc. 20346.

RECOVERY OF LOWER ALIPHATIC ACIDS.—Soc. des Usines Chimiques Rhone-Poulenc. (United States, Nov. 11, '36.) 20458.

DYEING, ETC., OF MATERIALS.—Soc. of Chemical Industry in Basle. (Aug. 17, '36.) (Switzerland, Aug. 17, '35.) 20528.

DYEING, ETC., OF MATERIALS.—Soc. of Chemical Industry in Basle. (Switzerland, Oct. 1, '35.) 20529.

DYEING, ETC., OF MATERIALS.—Soc. of Chemical Industry in Basle. (Aug. 17, '36.) (Switzerland, Dec. 21, '35.) 20530.

DYEING, ETC., OF MATERIALS.—Soc. of Chemical Industry in Basle. (Aug. 17, '36.) (Switzerland, July 31, '36.) 20531.

TREATMENT OF CELLULOSE ESTERS, ETC.—Soc. Rhodiaceta. (Germany, July 31, '36.) 20905.

PRODUCTION OF A PULVERULENT MATERIAL containing a bituminous material.—Straba Strassenbaubedarfs, A.-G. (Germany, July 25, '36.) 20532.

PRODUCTION OF COLOURED ASBESTOS CEMENT.—Turner and Newall, Ltd. (Austria, July 23, '36.) 20472.

BORON NITRIDE, ETC.—British Thomson-Houston Co., Ltd. (United States, July 31, '36.) 21047.

METHODS OF PURIFYING ORGANIC LIQUIDS.—British Thomson-Houston Co., Ltd. (United States, July 31, '36.) 21048.

MANUFACTURE OF SULPHONIC ACID AMIDE COMPOUNDS.—A. Carpmael (I. G. Farbenindustrie). 21029.

MANUFACTURE OF WATER-INSOLUBLE AZO-DYESTUFFS on vegetable fibres.—A. Carpmael (I. G. Farbenindustrie). 21510.

INSULIN PREPARATIONS.—A. Carruthers, W. N. Haworth, and S. E. Michael. 21298.

Specifications Open to Public Inspection

ALUMINIUM ALLOYS.—Vereinigte Deutsche Metallwerke, A.-G. Jan. 24, 1936. 20290/36.

ALUMINIUM ALLOYS.—Vereinigte Deutsche Metallwerke, A.-G. Jan. 25, 1936. 24821/36.

PROCESS FOR DYEING SKINS OR PELTS.—I. G. Farbenindustrie. Jan. 24, 1936. 34573/36.

PROCESS OF REMOVING SALTS from industrial water.—I. G. Farbenindustrie. Jan. 25, 1936. 34574/36.

PROCESS AND ARRANGEMENT FOR THE RECOVERY OF GASES or vapours by means of solid absorbent substances.—Carbonisation et Charbons Actifs. Jan. 20, 1936. 35044/36.

DETERGENT FOR TOILET USE containing incompletely esterified polyhydric alcohol.—Proctor and Gamble Co. Jan. 25, 1936. 35896/36.

DRYING-PROCESS.—Dr. A. Wacker Ges Fur Elektrochemische Industrie Ges. Jan. 20, 1936. 387/37.

PROCESS OF AND APPARATUS FOR THE CONTINUOUS DEACIDIFICATION and after-treatment of artificial fibres in endless form.—Zellwolle-Arbeitsgemeinschaft Ges. Jan. 24, 1936. 1631/37.

PROCESS FOR THE PRODUCTION OF PHOTOGRAPHIC EMULSIONS.—B. Claus. Jan. 20, 1936. 1746/37.

STABILISING THE PROPERTIES OF ALUMINIUM BASE ALLOYS.—Aluminium Laboratories, Ltd. Jan. 21, 1936. 1816/37.

MANUFACTURE OF CELLULOSE ARTICLES.—Deutsche Hydrierwerke, A.-G. Jan. 21, 1936. 1845/37.

MANUFACTURE OF HYDROXY-TRIMELLITIC ACID.—I. G. Farbenindustrie. Jan. 22, 1936. 1928/37.

COOLING OF GASES.—I. G. Farbenindustrie. Jan. 24, 1936. 1938/37.

PROCESS FOR THE MANUFACTURE OF PURIFIED GERMINAL GLAND HORMONE PREPARATIONS.—Schering-Kahlbaum, A.-G. Jan. 22, 1936. 1982/37.

ALKALINE EARTH FERTILIZER and process of producing same.—Metallges, A.-G., Jan. 24, 1936. 2019/37.

POLYMERISATION OF HALOGEN BUTADIENES.—E. I. du Pont de Nemours and Co. Jan. 25, 1936. 2135/37.

OLIGODYNAMIC TREATMENT OF LIQUIDS.—Katadyn, A.-G. Jan. 24, 1936. 2140/37.

POLYMERISED ORGANIC COMPOUNDS and their manufacture.—E. I. du Pont de Nemours and Co. Jan. 25, 1936. 2217/37.

MANUFACTURE OF SUBSTITUTED CARBOXYLIC ACID AMIDES and their polymerisation products.—E. I. du Pont de Nemours and Co. Jan. 24, 1936. 2218/37.

PROCESS FOR DYEING SKINS OR PELTS.—I. G. Farbenindustrie. Jan. 24, 1936. 14168/37.

PROCESS OF DYEING AND PRINTING MATERIALS.—Soc. of Chemical Industry in Basle. Aug. 17, 1935. 20528/37.

PROCESS FOR THE HYDROGENATION OF SOLID FUELS, tars, or the like.—Non-Poisonous Gas Holding Co., Ltd. Jan. 27, 1936. 22486/36.

METHOD FOR THE PURIFICATION OF WATER.—Soc. Anon. Pour L'Hydrologie. Jan. 29, 1936. 34653/36.

PROCESS FOR THE PREPARATION OF METHYL ALCOHOL from marble, and the production of fuel therefrom.—A.P.I.S. Soc. Anon. Prodotti Italiani Sintetici. Jan. 27, 1936. 35268/36.

VOLTOLISED OILS.—Standard Oil Development Co. Jan. 31, 1936. 35536/36.

MANUFACTURE OF PURE CELLULOSE.—M. Gunther. Jan. 28, 1936. 550/37.

SYNTHETIC RUBBER COMPOSITIONS.—Hercules Powder Co. Jan. 31, 1936. 1599/37.

PROCESS FOR THE PRODUCTION OF LIQUID HYDROCARBON PRODUCTS by destructive hydrogenation of distillable solid carbonaceous substances or products obtained therefrom.—International Hydrogenation Patents Co., Ltd. Feb. 1, 1936. 1761/37.

PROCESS FOR THE PRODUCTION OF VALUABLE HYDROCARBON PRODUCTS from bituminous coal by destructive hydrogenation.—International Hydrogenation Patents Co., Ltd. Feb. 1, 1936. 2253/37.

APPLICATION OF BASE-EXCHANGE ARTIFICIAL RESINS for purifying water or the like.—I. G. Farbenindustrie. Feb. 1, 1936. 2303/37.

MANUFACTURE OF CONDENSATION PRODUCTS of the anthraquinone series.—Chemical Works, formerly Sandoz. Jan. 27, 1936. 2418/37.

MANUFACTURE OF HIGHER HALOGENATED KETONES.—I. G. Farbenindustrie. Jan. 28, 1936. 2504/37.

METHOD OF CHLORINATING METHANE or a homologue thereof.—I. G. Farbenindustrie. Jan. 28, 1936. 2505/37.

MANUFACTURE OF HIGHER CHLORINATED METHANES.—I. G. Farbenindustrie. Jan. 29, 1936. 2506/37.

EXPLOSIVES and their processes of manufacture.—C. Baron and P. Verola. Jan. 28, 1936. 2516/37.

SOAP, and process of and apparatus for producing soap.—Refining, Inc. Jan. 29, 1936. 2534/37.

Specifications Accepted with Date of Application

LEAD-SODIUM ALLOY.—W. W. Triggs (E. I. du Pont de Nemours and Co.). Nov. 18, 1935. 469,244.

CARBONISATION OF FUEL.—J. H. Smith, H. T. Cohen, and Humphreys and Glasgow, Ltd. Nov. 20, 1935. 469,175.

THERMAL TREATMENT OF HYDROCARBONS.—G. W. Johnson (I. G. Farbenindustrie.) Nov. 4, 1936 469,101.

MANUFACTURE OF AN ACID-WOOL DYESTUFF of the anthraquinone series.—W. W. Groves (I. G. Farbenindustrie. Dec. 23, 1935. 469,390.

PRODUCTION OF CELLULOSE ETHERS.—Imperial Chemical Industries, Ltd., R. R. H. Brown, and A. J. Watters. Dec. 23, 1935. 469,391.

AZO DYESTUFFS.—A. H. Knight and Imperial Chemical Industries, Ltd. Jan. 17, 1936. 469,318.

MANUFACTURE OF ALKYLANILINE MONOSULPHONIC ACIDS.—S. Coffey, N. H. Haddock, and Imperial Chemical Industries, Ltd. Jan. 17, 1936. 469,108.

MANUFACTURE AND APPLICATION OF IMPROVED PREPARATIONS FOR COLOURING RUBBER.—M. Jones, W. F. Smith, A. Stewart, and Imperial Chemical Industries, Ltd. Jan. 17, 1936. 469,109.

TREATMENT OF OLIVE OIL.—Crosse and Blackwell, Ltd., W. Clayton, S. Back, J. F. Morse, and R. I. Johnson. Jan. 18, 1936. 469,113.

MANUFACTURE OF POLYMERISATION PRODUCTS.—Chemische Forschungsges. Jan. 19, 1935. 469,319.

PROCESS FOR THE MANUFACTURE OF ACID aminotriarylmethane dyestuffs.—A. Carpmael (I. G. Farbenindustrie.) Jan. 20, 1936. 469,443.

LOWERING OF THE SOLIDIFICATION POINT OF BITUMINOUS CARBON OILS.—A. Nathansohn. Jan. 21, 1936. 469,395.

PRODUCTION OF THERAPEUTIC REMEDIES.—J. Vorschutz. Feb. 19, 1935. 469,447.

MANUFACTURE OF PLASTIC MASSES.—W. W. Groves (Deutsche Celluloid-Fabrik). Jan. 22, 1936. 469,249.

MANUFACTURE OF ARSENOBENZENE-MONO-SULPHOXYLATES.—I. G. Farbenindustrie. April 3, 1935.

MANUFACTURE OF ARSENOBENZENE-MONO-SULPHOXYLATES.—I. G. Farbenindustrie. April 10, 1935. 469,324.

FOAMING AGENTS.—J. L. Moilliet, W. Todd, and Imperial Chemical Industries, Ltd. Jan. 22, 1936. 469,325.

ANTHRAQUINONE DYESTUFFS. N. H. Haddock, F. Lodge, and Imperial Chemical Industries, Ltd. Jan. 22, 1936. 469,449.

METHOD AND APPARATUS FOR TRANSFERRING LIQUEFIED GASES.—Linde Air Products Co. Jan. 24, 1935. 469,399.

MANUFACTURE AND PRODUCTION OF AMMONIUM SULPHATE and sulphur from gases.—G. W. Johnson (I. G. Farbenindustrie.) Jan. 23, 1936. 469,452.

PRODUCTION OF GLYCOL DERIVATIVES.—Distillers Co., Ltd., H. M. Stanley, J. E. Youell, and G. Minkoff. Jan. 24, 1936. 469,332.

MANUFACTURE OF FLUORO-HYDROCARBONS.—A. Carpmael (I. G. Farbenindustrie.) Jan. 24, 1936. 469,421.

CLEANSERS FOR GLASS, stone, brickwork, coatings, for instance oil or lacquer varnishes, likewise enamel coatings.—A. Carpmael (I. G. Farbenindustrie.) Jan. 24, 1936. 469,333.

PREPARATION OF PIGMENTS for enamels, lacquers, inks and the like.—E. I. du Pont de Nemours and Co. Feb. 28, 1935. 469,422.

DISPERSION OF PIGMENTS IN NITROCELLULOSE COMPOSITIONS.—E. I. du Pont de Nemours and Co. March 1, 1935. 469,423.

MANUFACTURE OF NITROCELLULOSE.—Du Pont Viscoloid Co. March 2, 1935. 469,424.

SHORTPATH HIGH-VACUUM DISTILLATION.—E. W. Fawcett, and Imperial Chemical Industries, Ltd. Jan. 24, 1936. 469,425.

DYEING.—Aceta Ges. Jan. 25, 1935. 469,457.

PROCESS OF PRODUCING AND REFINING ORGAN EXTRACTS.—Nyegaard and Co. Aktieselskab. Jan. 26, 1935. 469,430.

MANUFACTURE OF WASHING PREPARATIONS.—W. W. Groves (I. G. Farbenindustrie.) Jan. 27, 1936. 469,334.

MANUFACTURE OF SUPPLIES OF STABLE SOLUTIONS of laevo-ascorbic acid or other 2:3-ene-diol of a 1:4-lactone of the sugar series. I. G. Farbenindustrie. Jan. 26, 1935. 469,335.

HYDROGENATION OF ESTERS of carboxylic acids.—Rohm and Haas Co. May 9, 1935. 469,434.

MANUFACTURE AND PRODUCTION OF DYESTUFFS.—G. W. Johnson (I. G. Farbenindustrie.) Feb. 28, 1936. 469,139.

PROCESS FOR SEPARATING MIXTURES OF SUBSTANCES of high molecular weight not consisting solely of hydrocarbons.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. March 22, 1935. 469,201.

SOLUBLE THIOSULPHATES.—Kodak, Ltd. (Eastman Kodak Co.). April 2, 1936. 469,147.

MANUFACTURE OF WATER-MISCIBLE VITAMIN PREPARATIONS containing vitamin D.—Winthrop Chemical Co., Inc. Dec. 4, 1935. 469,150.

METHOD OF RE-MELTING AND REFINING MAGNESIUM and light metal alloys containing magnesium.—I. G. Farbenindustrie. July 19, 1935. 469,347.

TREATMENT OF HYDROCARBON OILS by fractional distillation and pyrolytic conversion.—Universal Oil Products Co. Aug. 9, 1935. 469,435.

PROCESS FOR THE MANUFACTURE OF LAEVO-ASCORBIC ACID.—T. Reichstein. June 18, 1935. 469,157.

PRODUCTION OF VALUABLE HYDROCARBON PRODUCTS, in particular high-boiling oils, from asphaltic substances by catalytic destructive hydrogenation.—H. E. Potts (International Hydrogenation Patents Co., Ltd.). June 26, 1936. 469,158.

PROCESS OF FORMING IRON OXIDE.—A. L. Smyly. July 7, 1936. 469,210.

PROCESS FOR THE MANUFACTURE OF ESTERS OF PINE WOOD PITCH. Hercules Powder Co. Aug. 21, 1935. 469,350.

MANUFACTURE OF SULPHURIC ACID.—W. W. Triggs (Soc. Generale Metallurgique de Hoboken). Sept. 7, 1936. 469,215.

PROCESS OF PRODUCING ANHYDROUS SUBSTANCES.—Autoxygen, Inc. Oct. 1, 1935. 469,352.

PROCESS OF PRODUCING EASILY-CRUSHED ANHYDROUS BORAX.—Chemische Fabrik Grunau Landshoff and Meyer, A.-G. Dec. 7, 1935. 469,162.

ELECTROLYTIC REFINING OF ALUMINIUM.—Aluminium-Industrie, A.-G., and H. Hurter. Nov. 13, 1936. 469,361.

PROCESS FOR OBTAINING ALCOHOL and/or yeast by fermentation of liquids containing carbohydrate.—Naamlooze Vennootschap Internationale Suiker en Alcohol Compagnie—International Sugar and Alcohol Co. Isaco. Nov. 22, 1935. 469,300.

CARBONATING APPARATUS.—F. A. S. Gwatkin (M. M. Welker, C. R. Vaughan, and General Dry Batteries, Inc.). Dec. 2, 1936. 469,227.

PROCESS FOR THE MANUFACTURE OF FORMALDEHYDE by electrosynthesis from carbon monoxide and hydrogen.—Usines de Melle. Dec. 24, 1935. 469,371.

MANUFACTURE OF ALLOY STEELS.—W. M. Burden, R. Genders, and R. Harrison. Sept. 22, 1936. 469,169.

CATALYTIC COMPOSITION FOR IMPROVING THE COMBUSTION OF SOLID FUELS.—Katalik, Ltd. April 29, 1936. 469,241.

MANUFACTURE OF METAL ALKYL COMPOUNDS.—E. I. du Pont de Nemours and Co. Oct. 27, 1934. 469,518.

MANUFACTURE OF DYES for use in photographic silver halide emulsions.—Gevaert Photo-Producten N.V. Oct. 27, 1934. 469,604.

CONDENSATION REACTIONS.—Deutsche Hydrierwerke, A.-G. Dec. 22, 1934. 469,548.

TREATMENT OF CELLULOSIC MATERIAL.—A. W. Baldwin, R. J. W. Reynolds, E. E. Walker, C. S. Woolvin, and Imperial Chemical Industries, Ltd. Dec. 24, 1935. 469,476.

PRODUCTION OF ACTIVATORS for sexual hormones.—A. G. Bloxam (Soc. of Chemical Industry in Basle). Jan. 23, 1936. 469,728.

MANUFACTURE OF DERIVATIVES of the 1:2:3:4-tetrahydroquinoline series.—A. G. Bloxam (H. Rupe). Jan. 24, 1936. 469,660.

PROCESS FOR THE MANUFACTURE OF POLYAZO DYESTUFFS.—A. Carpmael (I. G. Farbenindustrie.) Jan. 27, 1936. 469,562.

MANUFACTURE OF HYDROCYANIC ACID.—E. I. du Pont de Nemours and Co., and E. P. Bartlett. Jan. 27, 1936. 469,563.

MANUFACTURE OF SHAPED ARTICLES from polymerisable organic liquids.—P. H. Hull, and Imperial Chemical Industries, Ltd. Jan. 27, 1936. 469,564.

DESTRUCTIVE HYDROGENATION OF DISTILLABLE CARBONACEOUS MATERIALS.—H. E. Potts (International Hydrogenation Patents Co., Ltd.). Jan. 29, 1936. 469,735.

STABILISATION OF NITRATES OF CARBOHYDRATES.—E. Berl. Jan. 29, 1936. 469,663.

MANUFACTURE AND PRODUCTION OF POLYMETHINE DYESTUFFS.—G. W. Johnson (I. G. Farbenindustrie.) Jan. 30, 1936. 469,748.

DEGREASING NON-ABSORBENT ARTICLES.—W. E. Booth, and Imperial Chemical Industries, Ltd. Jan. 30, 1936. 469,675.

Weekly Prices of British Chemical Products

THERE are no price changes to report in the markets for general heavy chemicals, rubber chemicals, wood distillation products and intermediates. Unless otherwise stated the prices below cover fair quantities net and naked at sellers' works.

MANCHESTER.—Holidays in Lancashire and the near Yorkshire areas continue to affect the movement of chemicals on the Manchester market and this influence is likely to be felt pretty well throughout the present month. On the whole, however, trading conditions have been a little more active than they were a week ago. Fair quantities against existing contracts are moving forward into consumption and this applies both to textile chemicals and to most other descriptions, whilst a moderate volume of spot business has been reported. Prices in most sections are fully maintained. Among the by-products there has been a sprinkling of inquiry for pitch on export account. Crystal carbolic is in rather short supply, whilst a moderate demand has been experienced this week for the xylols and toluols.

GLASGOW.—Business in chemicals has been rather quiet during the week, the demand still being affected by holidays. Prices generally have shown an advancing tendency, due to increased working costs, and several articles show advances ranging from 5s. per ton upwards, though red lead and litharge exceptionally were reduced £1 due to the lower price of the metal. Only a moderate volume of business has been done in coal tar products during the week, and in certain sections the attitude of buyers might almost be described as purposefully dilatory in determining a course of action. Carbolic acids are commanding keener interest and prices remain very firm. Cresylic on the other hand tends to slacken and apart from high boiling phenols, very little fresh business has been arranged. Oil contract deliveries continue to flow regularly and inquiries are fairly numerous for available future supplies. Home pitch prices remain more or less nominal at 35s. per ton, with no marked appreciation in export values.

General Chemicals

ACETONE.—£45 to £47 per ton.

ACID, ACETIC.—Tech., 80%, £30 5s. to £32 5s. per ton; pure 80%, £30 5s.; tech., 40%, £15 12s. 6d. to £18 12s. 6d.; tech., 60%, £23 10s. to £25 10s. MANCHESTER: 80%, commercial, £30 5s.; tech. glacial, £42 to £46.

ACID, BORIC.—Commercial granulated, £28 10s. per ton; crystal, £29 10s.; powdered, £30 10s.; extra finely powdered, £32 10s. in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Crystals, £29 10s.; powdered, £30 10s. 1-cwt. bags in 1-ton lots.

ACID, CHROMIC.—9½d. per lb., less 2½%; d/d U.K.

ACID, CITRIC.—1s. per lb. MANCHESTER: 1s. SCOTLAND: B.P. crystals, 1s. per lb., less 5%, ex store.

ACID, FORMIC.—85%, in carboys, ton lots, £42 to £47 per ton.

ACID, HYDROCHLORIC.—Spot, 5s. to 7s. 6d. carboy d/d according to purity, strength and locality.

ACID, LACTIC.—LANCASHIRE: Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £50: pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £55; edible, 50% by vol., £41. One-ton lots ex works, barrels free.

ACID, NITRIC.—80° Tw. spot, £18 to £25 per ton makers' works.

ACID, OXALIC.—£48 15s. to £57 10s. per ton, according to packages and position. GLASGOW: £2 9s. per cwt. in casks. MANCHESTER: £49 to £55 per ton ex store.

ACID, SULPHURIC.—168° Tw., £4 11s. to £5 1s. per ton; 140° Tw., arsenic-free, £3 to £3 10s.; 140° Tw., arsenious, £2 10s.

ACID, TARTARIC.—1s. 1½d. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. MANCHESTER: 1s. 1½d. per lb. GLASGOW: 1s. 1d. per lb.

ALUM.—Loose lump, £8 7s. 6d. per ton d/d; GLASGOW: Ground, £10 7s. 6d. per ton; lump, £9 17s. 6d.

ALUMINIUM SULPHATE.—£7 per ton d/d Lancs.; GLASGOW: £7 to £8 ex store.

AMMONIA, ANHYDROUS.—Spot, 10½d. per lb. d/d in cylinders. SCOTLAND: 10½d. to 1s. 0½d., containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

AMMONIUM CARBONATE.—£20 per ton d/d in 5 cwt. casks.

AMMONIUM CHLORIDE.—LONDON: Fine white crystals, £16 10s. (See also Salammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

ANTIMONY OXIDE.—£55 10s. per ton.

ARSENIC.—LONDON: £13 10s. per ton c.i.f. main U.K. ports for imported material; Cornish nominal, £22 10s. f.o.r. mines. SCOTLAND: White powdered, £17 ex store. MANCHESTER: White powdered Cornish £17 10s., ex store.

BARIUM CHLORIDE.—£10 per ton. GLASGOW: £11 5s. per ton.

BISULPHITE OF LIME.—£6 10s. per ton f.o.r. London.

BLEACHING POWDER.—Spot, 35/37%. £8 15s. per ton in casks, special terms for contracts. SCOTLAND: £9 per ton net ex store.

BORAX COMMERCIAL.—Granulated, £16 per ton; crystal, £17; powdered, £17 10s.; extra finely powdered, £18 10s., packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Granulated, £16, crystal, £17; powdered, £17 10s. per ton in 1-cwt. bags, carriage paid.

CALCIUM CHLORIDE.—Solid 70/75% spot, £5 5s. per ton d/d station in drums. GLASGOW: 70/75% solid, £5 15s. per ton net ex store.

CHROMETAN.—Crystals, 2¾d. per lb.; liquor, £19 10s. per ton d/d

COPPER SULPHATE.—GLASGOW: £24 per ton.

CREAM OF TARTAR.—£3 19s. per cwt. less 2½%. GLASGOW: 99%, £4 12s. per cwt. in 5-cwt. casks.

FORMALDEHYDE.—£22 10s. per ton.

GLYCERINE.—Chemically pure, double distilled, 1.260 s.g., in tins, £5 7s. 6d. to £6 7s. 6d. per cwt. according to quantity; in drums, £5 to £5 13s. 6d.

IODINE.—Resublimed B.P., 6s. 4d. per lb. in 7 lb. lots.

LEAD ACETATE.—LONDON: White, £35 10s. per ton; brown, £35. GLASGOW: White crystals, £34 to £35; brown, £1 per ton less. MANCHESTER: White, £36 10s.; brown, £35 10s.

LEAD NITRATE.—£39 per ton.

LEAD, RED.—SCOTLAND: £37 per ton, less 2½%, carriage paid for 2-ton lots.

LEAD (WHITE SUGAR OF).—GLASGOW: £36 10s. per ton net, ex store.

LITHARGE.—SCOTLAND: Ground, £37 per ton, less 2½%, carriage paid for 2-ton lots.

MAGNESITE.—SCOTLAND: Ground calcined, £9 per ton, ex store

MAGNESIUM CHLORIDE.—SCOTLAND: £7 10s. per ton.

MAGNESIUM SULPHATE.—Commercial, £5 per ton, ex wharf.

MERCURY.—Ammoniated B.P. (white precip.), lump, 5s. 11d. per lb.; powder B.P., 6s. 1d.; bichloride B.P. (corros. sub.) 5s. 2d.; powder B.P. 4s. 10d.; chloride B.P. (calomel), 5s. 11d.; red oxide cryst. (red precip.), 7s.; levig. 6s. 6d.; yellow oxide B.P. 6s. 4d.; persulphate white B.P.C., 6s. 1d.; sulphide black (hyd. sulph. cum sulph. 50%), 6s. For quantities under 112 lb., 1d. extra.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

PARAFFIN WAX.—SCOTLAND: 3¾d. per lb.

PHENOL.—7¾d. to 8½d. per lb.

POTASH, CAUSTIC.—LONDON: £42 per ton. MANCHESTER: £39.

POTASSIUM BICHROMATE.—SCOTLAND: 5d. per lb., net, carriage paid.

POTASSIUM CHLORATE.—£36 7s. 6d. per ton. GLASGOW: 4¼d. per lb. MANCHESTER: £38 10s. per ton.

POTASSIUM IODIDE.—B.P. 5s. 6d. per lb. in 7 lb. lots.

POTASSIUM NITRATE.—£27 per ton. GLASGOW: Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 9¾d. per lb. SCOTLAND: B.P. Crystals, 9¾d. MANCHESTER: B.P. 11d. to 1s.

POTASSIUM PRUSSATE.—6½d. per lb. SCOTLAND: 7d. net, in casks, ex store. MANCHESTER: Yellow, 6½d.

SALAMMONIAC.—Firsts lump spot, £41 17s. 6d. per ton d/d in barrels. GLASGOW: Large crystals, in casks, £37.

SALT CAKE.—Unground, spot, £3 16s. 6d. per ton.

SODA ASH.—58% spot, £5 12s. 6d. per ton f.o.r. in bags.

SODA, CAUSTIC.—Solid, 76/77° spot, £12 10s. per ton d/d station. SCOTLAND: Powdered 98/99%, £18 10s. in drums, £19 5s. in casks, Solid 76/77°, £15 12s. 6d. in drums; 70/73%, £15 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts, 10s. per ton less.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—£18 per ton carriage paid North. GLASGOW: £18 10s. per ton net ex store.

SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags. GLASGOW: £13 5s. per ton in 1 cwt. kegs, £11 5s. per ton in 2-cwt. bags. MANCHESTER: £10 10s.

SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount 5%. MANCHESTER: 4d. per lb. GLASGOW: 4d., net, carriage paid.

SODIUM BISULPHITE POWDER.—60/62%, £20 per ton d/d 1 cwt iron drums for home trade.

SODIUM CARBONATE, MONOHYDRATE.—£15 5s. per ton d/d in minimum ton lots in 2 cwt. free bags.

SODIUM CHLORATE.—£26 10s. to £30 per ton. GLASGOW: £1 10s. per cwt., minimum 3 cwt. lots.

SODIUM CHROMATE.—4d. per lb. d/d U.K.

SODIUM HYPOSULPHATE.—Commercial, 2 ton lots d/d, £10 5s. per ton; photographic, £15. MANCHESTER: Commercial, £10; photographic, £14 10s.

SODIUM METASILICATE.—£14 per ton, d/d U.K. in cwt. bags.

SODIUM NITRATE.—Refined, £7 15s. per ton for 6-ton lots d/d.

Sodium Nitrite.—£18 5s. per ton for ton lots.
Sodium Perborate.—10%, 9½d. per lb. d/d in 1-cwt. drums.
Sodium Phosphate.—£13 per ton.
Sodium Prussiate.—4d. per lb. for ton lots. **Glasgow**: 5d. to 5¾d. ex store. **Manchester**: 4d. to 4¾d.
Sodium Silicate.—£9 10s. per ton.
Sodium Sulphate (Glauber Salts).—£3 per ton d/d.
Sodium Sulphate (Salt Cake).—Unground spot, £3 12s. 6d. per ton d/d station in bulk. **Scotland**: Ground quality, £3 5s. per ton d/d. **Manchester**: £3 12s. 6d.
Sodium Sulphide.—Solid 60/62%, Spot, £11 5s. per ton d/d in drums; crystals 30/32%, £8 15s. per ton d/d in casks. **Manchester**: Concentrated solid, 60/62%, £11; commercial, £8.
Sodium Sulphite.—Pea crystals, spot, £13 5s. per ton d/d station in kegs. Commercial spot, £8 15s. d/d station in bags.
Sulphate of Copper.—£20 per ton, less 2%, in casks. **Manchester**: £22 5s. per ton f.o.b. **Scotland**: £24 per ton less 5%, Liverpool, in casks.
Sulphur Precip.—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.
Zinc Sulphate.—Crystals, £9 per ton, f.o.r., in bags.

Rubber Chemicals

Antimony Sulphide.—Golden, 6½d. to 1s. 1d. per lb., according to quality. Crimson, 1s. 5½d. to 1s. 7d. per lb., according to quality.
Arsenic Sulphide.—Yellow, 1s. 5d. to 1s. 7d. per lb.
Barytes.—£6 to £7 10s. per ton, according to quality
Cadmium Sulphide.—7s. 8d. to 7s. 11d. per lb.
Carbon Bisulphide.—£31 to £33 per ton, according to quantity, drums extra.
Carbon Black.—3 11/16d. to 4 13/16d. per lb., ex wharf.
Carbon Tetrachloride.—£41 to £46 per ton, according to quantity, drums extra.
Chromium Oxide.—Green, 1s. 2d. per lb.
Diphenylguanidine.—2s. 2d. per lb.
India-rubber Substitutes.—White, 4½d. to 5d. per lb.; dark, 3½d. to 4½d. per lb.
Lamp Black.—£22 to £23 per ton d/d London; vegetable black, £28 to £48.
Lead Hyposulphite.—9d. per lb.
Lithopone.—30%, £16 10s. to £17 5s. per ton.
Sulphur.—£9 to £9 5s. per ton. **Sulphur precip. B.P.**, £55 to £60 per ton. **Sulphur precip. comm.**, £50 to £55 per ton.
Sulphur Chloride.—5d. to 7d. per lb., according to quantity.
Vermilion.—Pale, or deep, 5s. 3d. per lb., 1-cwt. lots.
Zinc Sulphide.—10d. to 11d. per lb., according to quality.

Nitrogen Fertilisers

Sulphate of Ammonia.—The following prices have been announced for neutral quality basis 20.6= nitrogen, in 6-ton lots delivered farmer's nearest station up to June 30, 1938; August, 1937, £7 3s. 6d. per ton; September, £7 5s.; October, £7 6s. 6d.; November, £7 8s.; December, £7 9s. 6d.; January, 1938, £7 11s.; February, £7 12s. 6d.; March/June, £7 14s.
Calcium Cyanamide.—No prices have yet been announced for delivery after July 31.
Nitro-Chalk.—£7 10s. 6d. per ton for delivery up to June 30, 1938.
Nitrate of Soda.—£8 per ton for delivery up to June 30, 1938.
Concentrated Complete Fertilisers.—£10 12s. to £11 1s. per ton for delivery up to August 31, in 6-ton lots to farmer's nearest station.
Ammonium Phosphate Fertilisers.—£10 5s. to £13 5s. per ton for delivery up to August 31, in 6-ton lots to farmer's nearest station.

Coal Tar Products

Acid, Cresylic.—97/99%, 5s. 3d. to 5s. 5d. per gal.; 99/100%, 5s. to 6s., according to specification; pale 99%, 5s. 6d. to 5s. 8d.; dark, 4s. 8d. to 4s. 10d. **Glasgow**: Pale, 99/100%, 5s. to 5s. 6d. per gal.; pale 97/99%, 4s. 6d. to 4s. 10d., dark, 97/99%, 4s. 3d. to 4s. 6d.; high boiling acids, 2s. to 2s. 6d. American specification, 4s. 3d. to 4s. 6d. **Manchester**: Pale, 99/100%, 4s. 9d. to 4s. 10d.
Acid, Carbolic.—Crystals, 7¾d. to 8½d. per lb.; crude, 60's, 4s. 3d. to 4s. 6d. per gal. **Manchester**: Crystals, 9d. per lb. f.o.b. in drums; crude, 4s. per gal. **Glasgow**: Crude, 60's, 4s. 3d. to 4s. 6d. per gal.; distilled, 60's, 4s 4d. to 4s. 8d.
Benzol.—At works, crude, 9½d. to 10d. per gal.; standard motor, 1s. 3d. to 1s. 3½d.; 90%, 1s. 4d. to 1s. 4½d.; pure, 1s. 8d. to 1s. 8½d. **Glasgow**: Crude, 10d. to 10¼d. per gal.; motor, 1s. 4d. to 1s. 4½d.
Creosote.—B.S.I. Specification standard, 6d. per gal. f.o.r. Home, 3¾d. d/d. **London**: 4½d. f.o.r. North: 5d. London. **Manchester**: 5¼d. to 6¼d. **Glasgow**: B.S.I. Specification, 6d. to 6¼d. per gal.; washed oil, 5d. to 5¼d.; lower sp. gr. oils, 5¼d. to 5¾d.
Naphtha.—Solvent, 90/160%, 1s. 6½d. to 1s. 7½d. per gal.; 95/160%, 1s. 8d. to 1s. 9d.; 90/190%, 1s. 1½d. to 1s. 3d. **London**: Solvent, 1s. 3½d. to 1s. 4d.; heavy, 11d. to 1s. 0½d. f.o.r. **Glasgow**: Crude, 6½d. to 7½d. per gal.; 90% 160, 1s. 7d. to 1s. 8d., 90% 190, 1s. 2d. to 1s. 3d.
Naphthalene.—Crude, whizzed or hot pressed, £10 to £11 per ton; purified crystals, £18 to £20 per ton in 2-cwt. bags. **London**: Fire lighter quality, £5 to £5 10s. per ton; crystals, £27 to £27 10s. **Glasgow**: Fire lighter, crude, £6 to £7 per ton (bags free). **Manchester**: Refined, £21 per ton f.o.b.
Pitch.—Medium, soft, 38s. per ton, in bulk at makers' works. **Manchester**: 36s. f.o.b., East Coast. **Glasgow**: f.o.b. Glasgow, 35s. to 37s. per ton; in bulk for home trade, 35s.
Pyridine.—90/140%, 9s. to 10s. per gal.; 90/180, 2s. 9d. to 3s. 6d. **Glasgow**: 90% 140, 9s. to 10s. per gal.; 90% 160, 7s. to 8s.; 90% 180, 2s. 6d. to 3s. **Manchester**: 9s. to 10s. at works.
Toluole.—90%, 2s. per gal.; pure, 2s. 6d. **Glasgow**: 90%, 120, 1s. 11d. to 2s. per gal.
Xylol.—Commercial, 2s. 3d. per gal.; pure, 2s. 5d. **Glasgow**: Commercial, 2s. to 2s. 1d. per gal.

Wood Distillation Products

Acetate of Lime.—Brown, £8 5s. to £8 15s. per ton; grey, £10 10s. to £11 10s. Liquor, brown, 30° Tw., 6d. to 8d. per gal. **Manchester**: Brown, £9 10s.; grey, £11 10s.
Charcoal.—£6 5s. to £12 per ton, according to grade and locality.
Methyl Acetone.—40-50%, £42 to £45 per ton.
Wood Creosote.—Unrefined 6d. to 1s. per gal., according to boiling range.
Wood, Naphtha, Miscible.—2s. 9d. to 3s. 3d. per gal.; solvent, 3s. 6d. to 3s. 9d. per gal.
Wood Tar.—£3 to £4 per ton.

Intermediates and Dyes

Acid, Benzoic, 1914 B.P. (ex toluol).—1s. 9¼d. per lb. d/d buyer's works.
Acid, Gamma.—Spot, 4s. per lb. 100% d/d buyer's works.
Acid, H.—Spot, 2s. 4¼d. per lb. 100% d/d buyer's works.
Acid Naphthionic.—1s. 8d. per lb.
Acid, Neville and Winther.—Spot, 3s. per lb. 100%.
Acid, Sulphanilic.—Spot, 8d. per lb. 100%, d/d buyer's works.
Aniline Oil.—Spot, 8d. per lb., drums extra, d/d buyer's works.
Aniline Salts.—Spot, 8d. per lb. d/d buyer's works, casks free.
Benzidine, HCl.—2s. 5d. per lb., 100% as base, in casks.
***m*-Cresol 98/100%.**—1s. 8d. to 1s. 9d. per lb. in ton lots.
***o*-Cresol 30/31° C.**—6½d. to 7½d. per lb. in 1-ton lots.
***p*-Cresol 34-5° C.**—1s. 7d. to 1s. 8d. per lb. in ton lots.
Dichloraniline.—1s. 11½d. to 2s. 3d. per lb.
Dimethylaniline.—Spot, 1s. 6d. per lb., package extra.
Dinitrobenzene.—7½d. per lb.
Dinitrochlorbenzene, Solid.—£72 per ton.
Dinitrotoluene.—48/50° C., 8½d. per lb.; 66/68° C., 10d.
Diphenylamine.—Spot, 2s. per lb., d/d buyer's works.
α-Naphthol.—Spot, 2s. 4d. per lb., d/d buyer's works.
***β*-Naphthol.**—9½d. to 9⅝d. per lb.; flake, 9½d. to 9¾d.
***α*-Naphthylamine.**—Lumps, 1s. per lb.; ground, 1s. 0½d. in casks.
***β*-Naphthylamine.**—Spot, 2s. 9d. per lb., d/d buyer's works in casks.
***o*-Nitraniline.**—3s. 11d. per lb.
***m*-Nitraniline.**—Spot, 2s. 7d. per lb., d/d buyer's works.
***p*-Nitraniline.**—Spot, 1s. 8d. to 2s. 1d. per lb. d/d buyer's works.
Nitrobenzene.—Spot, 4½d. to 5d. per lb., in 90-gal. drums, drums extra. 1-ton lots d/d buyer's works.
Nitronaphthalene.—9d. per lb.; P.G., 1s. 0½d. per lb.
Sodium Naphthionate.—Spot, 1s. 9d. per lb., 100% d/d buyer's works.
***o*-Toluidine.**—10½d. per lb., in 8/10-cwt. drums, drums extra.
***p*-Toluidine.**—1s. 10½d. per lb., in casks.
***m*-Xylidine Acetate.**—4s. 3d. per lb., 100%.

Latest Oil Prices

London, Aug. 11.—**Linseed Oil** was irregular. Spot, £32 10s. per ton (small quantities). Aug., £30, sellers; Sept.-Oct., £29 12s. 6d.; and Jan.-April, £29 12s. 6d., sellers. **Soya Bean Oil** was unchanged. Oriental (bulk) afloat, Rotterdam, £23 15s. per ton. **Rape Oil** was unchanged. Crude, extracted, £37 per ton; technical refined, £38, naked, ex wharf. **Cotton Oil** was quiet. Egyptian, crude, £27 10s. per ton; refined common edible, £31; deodorised, £33, naked, ex mill (small lots £1 10s. extra). **Turpentine** was easier. American, spot, 35s. 6d. per cwt.
Hull.—**Linseed Oil.**—Spot, quoted £30 10s. per ton; Aug., £30; Sept.-Dec. and Jan.-April, £29 12s. 6d. **Cotton Oil.** Egyptian, crude, spot, £28; edible refined, spot, £31; technical, spot, £31; deodorised, £33, naked. **Palm Kernel Oil**, crude, f.m.q., spot, £25 10s., naked. **Groundnut Oil**, extracted, spot, £31; deodorised, £34. **Rape Oil**, extracted, spot, £36; refined, £37. **Soya Oil**, extracted, spot, £31; deodorised, £34 per ton. **Cod Oil**, f.o.r. or f.a.s., 27s. 6d. per cwt., in barrels. **Castor Oil**, pharmaceutical, 44s. 6d.; firsts, 39s. 6d.; seconds, 37s. 6d. **Turpentine**, American, spot, 38s. per cwt.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

(NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

BRITISH ALUMINIUM CO., LTD., London, E.C.—July 30, by order on terms, disposition supplemental to Trust Deed dated September 12, 1934; charged on 9 Rosebery Crescent, Edinburgh. *£3,500,000. April 14, 1937.

MIDLAND COSMETIC LABORATORIES, LTD., Leicester.—July 28, £250 debenture to L. H. Welch, Leicester; general charge.

Satisfactions

EGYPTIAN OIL AND CAKE MILLS, LTD., London, E.C.—Satisfactions July 29, of mortgage registered November 4, 1931, and of agreement registered March 16, 1932.

PLASTICS DEVELOPMENTS SALES, LTD., Liverpool.—Satisfaction July 30, of debenture registered November 20, 1936.

Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

South Africa.—H.M. Trade Commissioner at Johannesburg reports that the South African Railways and Harbours Administration is calling for tenders for the supply and delivery of quantities of disinfectant fluid. Tenders endorsed "Tender No. 1412 for Disinfectant Fluid" should be addressed to the Chief Stores Superintendent, South African Railways, Johannesburg, by whom they must be received before September 27, 1937.

Australia.—H.M. Trade Commissioner at Melbourne reports that the Electrical Engineering Branch of the Victorian Railways is calling for tenders (Specification No. 49177) for the supply and erection at Newport Power Station, Melbourne, of two steam boilers, complete with all accessories, including superheaters, economisers, air heaters, furnaces, feed regulators, etc. Tenders should be addressed to The Secretary for Railways, Melbourne, by whom they will be received up to December 22, 1937. (Ref. T. 18274/37.)

British India.—A firm of merchants' and manufacturers' representatives, the proprietor of which is at present in this country, desires to obtain the representation, for the whole of India, of United Kingdom manufacturers of chemicals, paints, varnishes. (Ref. No. 89.)

Canada.—A firm of brokers and manufacturers' agents established at Edmonton, Alberta, wish to obtain the representation, on a commission or purchasing basis, for Western Canada, of United Kingdom manufacturers of drugs, disinfectants. (Ref. No. 90.)

Denmark.—The Commercial Secretary to H.M. Legation at Copenhagen reports that the Copenhagen Lighting Department is calling for tenders, to be presented in that city by August 31, 1937, for the supply of one evaporator and one de-aerator. Further details upon application to the Department of Overseas Trade, 35 Old Queen Street, London, S.W.1. (Ref. T.Y. 25959/37.)

Brazil.—An agent established at Ceara, Pernambuco, Brazil, wishes to obtain the representation, on a commission basis, of United Kingdom manufacturers of chemical products. (Ref. No. 105.)

Company News

Macleans.—The net profit for 12 months to June 30 was £86,913 higher than the previous year's figure and amounted to £266,259. Increasing sales of the company's stomach powder and peroxide toothpaste, have largely contributed to this result. The company has also drawn a substantial revenue from its investment in Fynnon, Ltd., a company formed to market Fynnon salt. By raising the final ordinary dividend from 5 to 12½ per cent. the total distribution for the year is doubled at 20 per cent.

Oxley Engineering.—Payment of 1¼d. per share, tax free, is announced. The company was incorporated on April 7, 1937, to acquire the existing business previously carried on under the same name. The present dividend is for a broken period, i.e., April 7 to June 30, 1937, and is equivalent to approximately 13 per cent. per annum. Meeting, Leeds, September 3.

National Drug and Chemical of Canada.—An interim of 3 per cent. is announced in respect of year ending January 31, 1938, on participating preference shares, payable August 7.

Waxed-Papers.—An interim of 3 per cent. actual, less tax (nil) on ordinary shares on account of 1937 is announced; the half-yearly preference dividend is also announced, both payable September 1.

Yardley and Co.—An interim of 15 per cent. actual, less tax, on the ordinary shares, payable August 14 (same) is announced.

International Nickel Co., of Canada.—The interim financial statement for the six months ended June 30, 1937, shows a net profit of $14,199,394, equivalent to 94 cents per share on the common stock after allowing for the preferred dividend for the second quarter of 1937. This compares with a net profit of $11,714,956 for the first quarter of the current year, which was equal to 77 cents per share on the common. Net profit for the first six months of 1937 was $25,914,351, as compared with $17,456,974 for the first half of 1936, or $1.71 per share as against $1.13 a year ago. The consolidated balance sheet as of June 30 shows current assets at $81,246,250, including $46,259,596 in cash.

Chemical and Allied Stocks and Shares

FOLLOWING the recent partial recovery in industrial and other shares, profit-taking has been more in evidence this week. Nevertheless, there was a tendency for buyers to be attracted by any decline in prices, and a firm undertone has been maintained since the commencement of the new Stock Exchange account on Monday.

Borax Consolidated were a good feature, there having been a rise on the week from 30s. 9d. to 31s. 6d. Last year's dividend was 7½ per cent. and the belief in the market is that an increase to 8 per cent. or 9 per cent. is likely for the current year, the assumption being the recovery in the company's earning power is making further good progress. Turner and Newall were in steady request and have moved up to 98s. 9d. on wider anticipations of an increase in the final dividend. It is true that no change was made in the interim payment, but it is the company's usual custom to leave all question of an increase until the final payment. B. Laporte were in demand at higher prices, business having been recorded up to 110s. The list price is wide at 100s. to 110s., which can hardly be regarded as giving a satisfactory indication of the basis on which buying and selling can be effected.

Murex, British Oxygen and various of the more heavily-priced shares were reported to be in much better demand. Metal Industries were in request on the assumption that the company will benefit from the rise in scrap metal prices, while there was better demand for Metal Traders and Amalgamated Metal, it being hoped that activity in the metal markets may connote increased earnings for these companies. Fison, Packard and Prentice were higher, business being recorded around 39s. 9d. Triplex Safety Glass at 72s. are within a few pence of the price current a week ago, the price having fluctuated moderately awaiting the dividend announcement. United Glass Bottle were higher around 53s. 6d. It is generally expected the interim dividend of the latter company will be unchanged, but that, despite the larger capital in issue, an increase in the final dividend is likely. Distillers have been rather out of favour and have declined to 111s. United Molasses at 32s. 10½d. made a higher price on balance, the general assumption being that the dividend is likely to be brought up to at least 20 per cent.

Boots Pure Drug retained the higher price of 52s. 6d. mentioned last week, but there was a certain amount of profit-taking in Timothy Whites and Taylors, which have gone back 1s. to 35s. Sangers are lower at 25s. 3d., but are "ex rights" to the new issue. The latter company has an excellent profit-earning record and it is still believed in the market there should be no difficulty in maintaining the dividend on the enlarged capital. British Drug Houses were around 22s., but inactive, although a favourable yield is offered, last year's dividend having been 6 per cent. British Glues were again 8s. 6d. British Industrial Plastics, which were again active, transferred around 3s. 1½d. Beechams Pills were higher at 69s. 6d., there being expectations of an increase in the forthcoming interim dividend and that it is likely a further scrip bonus may be distributed with the final dividend.

Pinchin Johnson, International Paint and other paint shares were again very firm in advance of the interim dividend declarations. It is not expected in the market there will be any increases in the latter as it is felt the question of larger payments is likely to be left until the final dividends. Goodlass Wall and Lead Industries held their recent improvement to 13s. Unilever have risen to 43s. and Unilever N.V. to 45s. 6d. on further consideration of the directors' proposals. Lever Brothers preference were steady around the same prices as a week ago, but the preferred ordinary moved up on balance. Dorman Long, Staveley Coal and Iron and Consett Iron continued to make better prices. Textile shares remained out of favour, although a better tendency was reported in Calico Printers' ordinary and preference shares.